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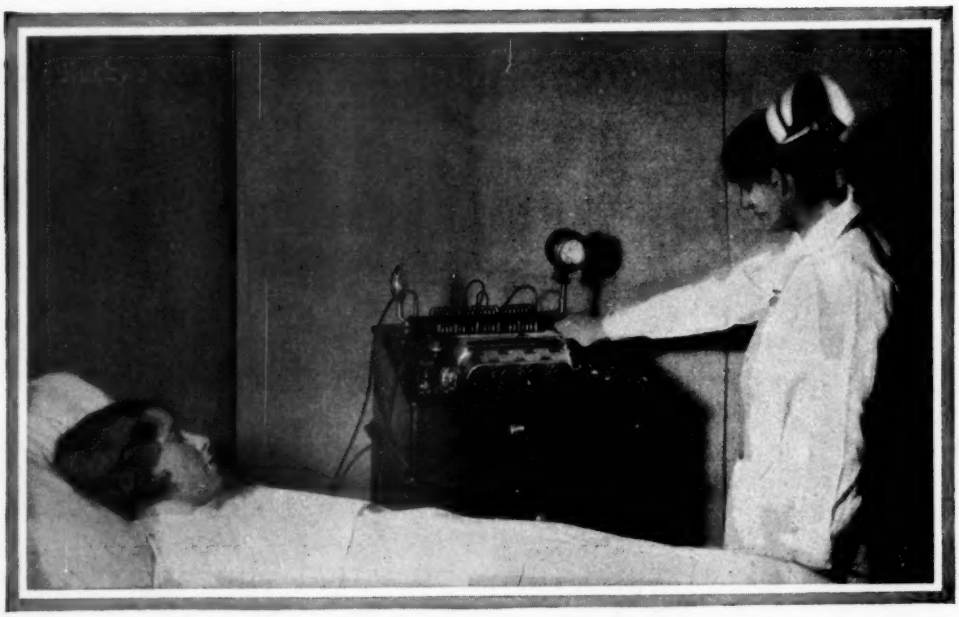

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A REPORT from the Department of Physiotherapy of a well-known New York hospital, dealing with diathermy in pneumonia and its sequelae, states as follows:

"As a rule diathermy is indicated in acute pneumonia, especially so when the symptoms are becoming or already are alarming: temperature is high, the patient is delirious, the pulse is extremely rapid, cyanosis is deep, the respiration rate is high, the breathing is very shallow, and the cough remains unproductive. Not infrequently in a pneumonia case with such alarming symptoms, after a few diathermy treatments an entire change of the picture takes place: cyanosis lessens, respiration becomes deeper, the quality of pulse improves, the rate decreases, the temperature is lowered, and the cough becomes productive. Auricular fibrillation that develops occasionally in similar pneumonias or other types of pneumonia where the toxemia is great, has been changed to a perfect normal rhythm after a few diathermy treatments."

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ARCHIVES OF
PHYSICAL THERAPY
X-RAY, RADIUM

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ELECTROSURGERY*

WILLIAM L. CLARK, M.D.
PHILADELPHIA

It is a matter of personal gratification to observe that slowly but surely, ancient prejudices and misunderstandings regarding electricity as a therapeutic agent, are disappearing before the rapidly growing evidence in its favor submitted by men whose experience and scholastic attainments command respect and attention. The use of electricity has been retrieved by critical test in laboratory and clinic, from the lowly realm of empiricism to an exalted place among the scientific units in our working armamentarium.

OBSTACLES AND OPINIONS

In the early days progress toward enlightenment was slow and difficult. Many years ago colleagues with friendly motives, pleaded with me to abandon electrotherapeutics owing to its limited possibilities and also to the opposition to its use. Though it was a crucial decision to make I did not consider the reasons given sufficient to warrant abandonment of a measure which I had found so interesting and satisfactory in practice.

An accomplished surgeon once remarked to me that he was convinced electrosurgery[1] had merit but that he and his associates did not practice it, nor think it prudent to speak about it before medical society meetings lest it might give encouragement to charlatans. This attitude of mind was quite prevalent a few years ago. Though there might have been some justification for this attitude up to a certain point, it did not seem quite right that a good method should be cast into the discard for the insufficient reasons given. I have cited this example to show the pseudo logic of some critics and, also, the courage required of the pioneers to carry on against such inconsistencies of thought, and at the same time, keep their feet squarely on the ground. This surgeon, remarkable as it may seem, later changed his attitude and now practices electrosurgery and publicly proclaims it at every opportunity.

It is interesting to note the ever increasing number of former critics of electrosurgery who have finally become convinced of its value and are now enthusiastic advocates of it. Is it not true that an open mind is a valuable asset to possess, and that it often saves one from humiliation and, possibly, continuance in grievous error?

A professor of surgery, in a Class A medical school, in an address before a large gathering of

*Chairman's address, Symposium on Electrosurgery, American Academy of Physical Therapy, Philadelphia County Medical Society Auditorium, Philadelphia, Pa., December 5, 1929.

[1]For convenience, the term electrosurgery will be employed to designate operations performed by the desiccation, coagulation and electrosurgical knife methods. The term operative surgery, to express operations by the cold scalpel, without the aid of the high frequency electric current. Electrolysis, otherwise known as ionic surgery, should be classified under electrosurgery, but the present paper will deal only with the surgical uses of the electric current of high frequency.

physicians stated: "Without exception, any case of cancer can be treated more effectively by operative surgery alone than by any other measure." Of course, his statement was fallacious and could easily have been refuted. *The fact of the matter is that there are many cases of malignant disease that could not possibly be treated with any chance of success by operative surgery at all, but which could be successfully treated either by some form of electrosurgery, radium, x-rays or in combination. Had he said that operative surgery was indispensable in many cases of cancer, though contra-indicated in others, and that in some instances other measures were more efficacious, he would have been correct. This would have been a conservative statement. Many listeners, who naturally respect the opinions of those in high places, doubtless carried home with them a false impression. It is unfortunate that frequently those to whom we look for guidance against error, in reality lead us into error. It is unwise for one to dogmatize unless sure his doctrine is sound.*

CONSTRUCTIVE CRITICISM CONDUCIVE TO PROGRESS

A conservative attitude of mind is praiseworthy, and is the best insurance against error, and, indeed, at times, against imposture. Honest criticism should, therefore, be welcomed, providing the critic is conversant with the facts in the case and is free from prejudice. In this connection it cannot be denied some electrosurgical advocates might have been more conservative in their claims. This fault, however, if it exists, is not peculiar alone to those employing electrosurgery, since over appraisement is a fault of many advocates of every other procedure employed in medicine and surgery. A critical perusal of current and past medical literature will reveal the truth of this statement. *Happily, however, regardless of this existing condition, the profession can as a whole, be relied upon to separate the wheat from the chaff and, in the last analysis, arrive at a sound conclusion regarding the truth or unreliability of what they may hear and read. The present place in the sun of electrosurgery is the best proof of this discernment.*

It is a satisfaction to observe that an ever increasing number of physicians of high standing and calibre are becoming interested in electrosurgical work and they have already greatly broadened the scope of electrosurgery, even beyond early expectations. The field is open and the possibilities for further development great.

A VALUABLE CONTRIBUTION TO SURGERY

Those who have had wide experience with both scalpel and electrosurgery will, I think, agree that electrosurgery is, indeed, one of the most valuable contributions to medicine of modern times. *In this connection, may I state as a strong conviction, that electrosurgery should be employed only by those who have had good general surgical training. This is mentioned because of the tendency of some physicians to take up the work without thorough surgical training, neglect of which will not only harm the cause, but might also jeopardize the lives of patients as well.*

IMPORTANCE OF GOOD TECHNIC

I desire, also, to impress that the technic of electrosurgery is not easy nor to be undertaken lightly. Much good can be done by its judicious use and great harm by its improper use, even in the hands of otherwise accomplished surgeons. Thorough preparations should, therefore, be made before engaging in what might be a hazardous procedure.

I frequently receive letters from physicians, stating that they have purchased equipment for the practice of electrosurgery and have cases on hand ready for operation. They request that instructions regarding the technic be sent to them promptly, so that they will be sure to perform the operation correctly. It is true that these physicians are quite sincere but unfortunately they underestimate the time necessary to overcome difficulties before acquiring technic to

successfully practice electrosurgery in its various phases. They might almost as appropriately have stated that they had purchased a violin and request that instructions for playing it be sent them so that they might be prepared to play at a concert the next evening. This is not far from a true analogy as would perhaps seem at first thought. My purpose in citing this example is to again strongly emphasize the very important fact that perfect technic can only be learned by proper training and then with sufficient practical experience.

LIMITATIONS OF ELECTROSURGERY

While those who employ electrosurgery have reason to be enthusiastic, they should not grow so enthusiastic as not to realize its limitations, for it has indeed, limitations. They should be trained to know when other methods are indicated in preference to electrosurgery and also when other measures should be used in combination with it. In this connection we should not lose sight of the value of operative surgery, radium and x-rays, especially in cancer work. Electrosurgery cannot be practiced to full advantage without according to the other methods mentioned, full and equal consideration.

Each case should be regarded as a law unto itself and studied with the aid of our superior present day laboratory and other facilities, intelligently and judicially, before a decision regarding the proper mode of treatment is reached. Regardless of all care some mistakes will be made, but with increased experience and infinite attention to details, it will be found that errors of diagnosis and of judgment will be minimized.

ELECTROSURGERY NOT OPPOSED TO REGULAR OPERATIVE SURGERY, BUT AN ADJUNCT TO IT

Electrosurgery should not be considered as something opposed to regular operative surgery. It is proper that both of these surgical methods should be considered together and, if possible, practiced when indicated by the same surgeon. The field of application, however, of both methods is so great and the technic so varied, that it seems to me quite proper that a surgeon who desires to do so may advantageously specialize in one or the other, neither opposing the other. Surely, the finer the specialization, the more expert one becomes. There is no special field in surgery, in which electrosurgical methods can not be employed to advantage. One, therefore, practicing general electrosurgery, must be conversant with the requirements of the many specialties.

TEACHING OF ELECTROSURGERY IN MEDICAL CENTRES

Medical schools are gradually adding electrosurgery to their curricula. Eventually this work will be properly taught in all medical centres in conjunction with general surgical methods, thus obviating the necessity in some instances, of surgeons learning their technic from salesmen of apparatus, or from physicians not properly trained in the work. Electrosurgery must be seriously considered, for it is beyond doubt, of superior value and quite worthy of surgeons' serious study and practice.

THOROUGH WORK ADVISABLE

Lesions, both malignant and benign, should, when possible, be destroyed or removed with one operation when electrosurgery is indicated. If this cannot be done, electrosurgery is as a rule, contra-indicated and should not be employed. The practice of deliberately treating a malignant tumor or indeed, any adventitious growth by a series of destructive high frequency applications, should be discontinued, since it will in all probability only stimulate the disease.

GROUP PRACTICE

Since it is well nigh impossible for one man to become thoroughly proficient in the expert application of all these measures, group practice is perhaps the best solution. If one is not in a position to employ all recognized methods and adjuncts either himself or in group practice, he has no right to treat cancer, except possibly, in selected cases.

IMPORTANCE OF PRELIMINARY STUDIES

I would again stress the wisdom of preliminary laboratory and clinical study of cases, un-

less immediate operation is imperative, when the quick judgment of the surgeon must prevail. When one can afford to temporize, however, the helpfulness of the following studies should be considered, i. e., blood chemistry, a blood count, blood coagulation test, urinalysis, kidney functional test, Wasserman reaction and confirmatory tests, basal metabolism, electrocardiogram, x-ray study and physical examination. Complications will thus frequently be discovered which will have a direct or an indirect bearing upon the work in hand and will assist one to a decision whether it is safe to operate without delay or to wait until complications have been corrected. For example, electrosurgery should, if possible, be avoided in diabetic cases before proper preliminary treatment. Primary and tertiary leutic lesions have been treated by electrosurgery in mistake for malignancy, owing to neglect to make the Wasserman test. It is true that both cancer and syphilis may exist in the same lesion, but it is nevertheless desirable to know the facts. It is important to know in advance whether or not the patient is a hemophiliac. Numerous other instances could be cited in which proper studies proved to be of great importance, both to the operator and patient alike.

HEMORRHAGE

When electrosurgery is employed, hemorrhage, immediately after the operation, is not likely to occur, yet it may occur in certain cases, when the slough separates and large vessels are implicated. This risk, when such a possibility exists, should be obviated by preliminary ligation of the proper blood vessels, if it is practical to do so. This is especially true when the desiccation or coagulation methods are employed, in which case sutures are not used and wounds heal by granulation. When the electrosurgical knife is used, vessels are ligated, the incision sutured and wounds are expected to heal by first intention.

GASTROSTOMY AND COLOSTOMY

In mouth and throat cases of malignancy when a patient's vitality is low and he is undernourished, owing to inability to ingest the proper amount of food, a preliminary gastrostomy[2] should be performed and the patient fed through a tube until in proper physical condition to withstand the proposed operation. A gastrostomy can be readily done under local anesthesia and the opening in the stomach closed when it has served its purpose. In some instances a feeding tube passed into the stomach through the nasal passage can be substituted for the gastrostomy. Likewise, it is often prudent to perform a colostomy before treatment of cancer of the rectum. There are numerous other circumstances frequently met wherein operative surgery and some form of electrosurgery can be employed to advantage, in combination.

ADVANCED CANCER CASES

Even in some hospitals devoted exclusively to the study and teatment of neoplastic diseases, some advanced cancer cases are pronounced hopeless, and upon advice of consultants, doomed to morphinism until the end of their lives. Recognition of proper indications and well directed efforts will often give such patients at least a fighting chance and, indeed, in some of them, more than palliation can be accomplished. In some of these hospitals, electrosurgery is not employed. In some others it is practiced but without due regard to its full possibilities. *May I impress the fact that electrosurgery will infrequently reclaim cancer cases that would have been quite hopeless were these methods not available?*

Inquiry of the director of a large, heavily endowed hospital with special facilities for the treatment of cancer, why so many advanced cancer cases were declined treatment, elicited the frank reply that it was not desired to increase the mortality statistics more than necessary. Information from reliable sources indicates that this case is not particularly exceptional. Is it not the duty of physicians, especially those professing to be specialists, to give every possible attention to advanced cancer cases

[2]Such operations as gastrostomy and colostomy may be performed either by regular operative surgery or by means of the electrosurgical knife. Many surgeons who have had experience with both methods, prefer the latter method.

even if incurable, at least for the promotion of physical and mental comfort, and possibly for the prolongation of their lives, regardless of any other consideration?

DESICCATION, COAGULATION AND ELECTRO-SURGICAL KNIFE

The field of usefulness of the electrothermic effects, desiccation and coagulation in the treatment of neoplastic and allied diseases in accessible anatomical locations, has been amply demonstrated, and as stated before, wounds heal by granulation. The electrosurgical knife has also been shown to be of value, wounds healing by first intention, thus fulfilling a need in locations not possible to treat by the desiccation and coagulation methods.

SCOPE OF ELECTROSURGERY

The scope of electrosurgery in its various phases is constantly growing, especially in breast, thoracic, sinus, pelvic, abdominal, genito-urinary, neurosurgical, eye, tonsil work, etc. With still greater improvement in instrumentation, of technic and with increased practice, I predict that electrosurgery will continue to grow in usefulness; and indeed, to be quite indispensable in surgical practice.

CONCLUSION

Numerous other important points of guidance besides the few mentioned, gleaned from research and practical experience, of interest to students of electrosurgery, could be mentioned; thus, perhaps, assisting them in some instances to avoid costly errors. Further discussion of this broad subject, will however, be left to the speakers to follow.

May I urge that we all work diligently for the further development of electrosurgery along scientific lines, not only for the enhancement of the best interests of the medical profession, but also for that which is really paramount: the advancement of human welfare?

2215 Walnut Street, Philadelphia, Pa.

CHANGES OCCURRING IN THE BLOOD OF THE NEW-BORN FOLLOWING ULTRAVIOLET THERAPY*

HEYWORTH N. SANFORD, M.D.
CHICAGO, ILL.

With the increasing use of the ultraviolet light as an important therapeutic measure in the treatment of children, it is obviously necessary to ascertain the effect that this procedure has on the blood of the young organism. Here we have an ideal situation of a body fluid that has yet been uninfluenced by external elements. For this reason the following studies were made on a series of new-born infants.

Bleeding Time, Coagulation Time, and Blood Platelets[1]

This study is based on a series of fifty new-born infants. These infants were all of normal delivery, and the mothers had not been subjected to any anesthetic that would interfere with the bleeding time and the coagulation time[2], which, with the blood platelet count, were taken immediately after birth, and at intervals of twenty-four hours thereafter. At the end of the fourth day, the ultraviolet treatments were begun on alternate infants; thus there were twenty-five normal new-born infants for a control and twenty-five who had received irradiations. These treatments were not given until the fourth day, so that the bleeding and coagulation time would return to a lower value, as Rodda[3] has shown occurs at this time.

The ultraviolet treatments were given by means of a mercury-vapor quartz lamp of 50 cycles, 5 amperes and 210 volts. The exposures were directly to the skin at a distance of 30

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inches from the body. The head was well protected from the rays, and the initial exposures consisted of one minute each for the entire dorsal and ventral surfaces of the body. It was found that if the initial exposure for the newborn infant was longer, erythema would develop. These exposures were increased one minute a day for four days and then stopped, the last exposures, therefore, lasting four minutes each for the entire dorsal and ventral surfaces. The exposures never caused the child discomfort. If the eyes are well protected and opportunity is given for easy breathing, the children will usually sleep throughout the entire proceeding.

RESULTS OF EXPOSURE TO ULTRAVIOLET LIGHT

TABLE 1.

Results of Exposure to Ultraviolet Light

	Bleeding Time	Clotting Time	
Time	Minutes	Minutes	Platelets
NORMAL			
Birth	3	4½	250,000
24 hours	3	4	300,000
48 hours	3½	4½	280,000
3 days	4	5	320,000
4 days	4	6	300,000
5 days	3½	5	280,000
6 days	3	4½	280,000
7 days	3	4	300,000
8 days	3	4	300,000
9 days	3	4	310,000
10 days	3	4	300,000
ULTRAVIOLET EXPOSURE			
	Ultraviolet Started		
	Bleeding Time	Clotting Time	
Time	Minutes	Minutes	Platelets
5 days	3	4½	360,000
6 days	2	4	400,000
7 days	2	4	410,000
8 days	2	4	440,000
	Ultraviolet Stopped		
9 days	2	4	400,000
10 days	2½	4	380,000

Comment

It will be observed from the results given in the table that in the normal infant there is no direct relation between the number of platelets found and the age of the child. The platelets are evidently influenced in their fluctuations by circumstances not at present apparent. These variations were noted by Morse[4] and later by Lucas[5], and by McLean and Caffey.[6] This, however, is not the case with the infants treated with the ultraviolet light. Here there is an immediate and direct increase amounting to 140,000 platelets in four days, or one third of the total count. This apparently falls to normal after exposure is stopped.

In the infants receiving irradiation there is a decrease of one minute from the normal bleeding time. This decrease is also in direct relation to the increase in blood platelets. Sooy and Moise[7] obtained similar results in an adult suffering from iodiopathic purpura.

There was no change in the coagulation time. This is, no doubt, due to the fact that in the organism in which the blood is deficient in calcium, the ultraviolet irradiation will increase this calcium;[8] on the organism with a normal amount of blood calcium the ultraviolet light has no such effect. This has been demonstrated by Lesne and his co-workers[9] and by Reed and Tweddy.[10]

The question arises as to whether this decrease in the bleeding time is due to an increase in the formed elements of the blood, or to some obscure metabolic change. It is known that ultraviolet radiations are capable of acting on the capillary and lymph circulation and on the cells on the surface of the exposed person to induce such actinic or chemical change as to assimilate substances from the blood stream.[11] However, this property of decreasing the bleeding time of the blood is not confined to ultraviolet light, but is also the property of the roentgen ray.[12] Furthermore, that there has been a direct change in the blood itself has been shown by Pagniez[13] for when the blood supply to a part that was under irradiation was blocked, there was no change in the constituents of the blood in other parts of the body. Laurens,[14] has shown that the cellular elements of the blood are influenced by light and darkness, light causing an increase, and darkness a decrease, while De Gheldere[15] has found an increase in the leukocytes after ultraviolet irradiation.

It may be assumed, therefore, that there is a general property in these agents which is

capable of increasing the blood elements by means of the platelet increase, thus lowering the bleeding time.[16] In infants suffering from hemorrhagic disease of the new-born and other forms of delayed coagulation and bleeding time, treatment with ultraviolet irradiation would offer a companion therapeutic measure with other accepted methods of treatment.

ERYTHROCYTES AND HEMOGLOBIN[17]

This study is based on the observations on a series of 200 new-born infants, during a period of eight months. The erythrocyte count and hemoglobin determinations were made within six hours after birth, and at twenty-four hour intervals thereafter. The determinations were made at the same time every day. Treatments with the ultraviolet ray were begun on alternate infants on the second day, and continued thereafter at the same time on each of the following four days. (See Tables 2 and 3.)

TABLE 2

Hemoglobin Content in Series of New-Born Infants

	NORMAL								ULTRAVIOLET EXPOSURE			
	Maximum		Minimum		Average		Average		Minimum		Maximum	
	Gm. per 100 Cc.	Per Cent	Gm. per 100 Cc.	Per Cent	Gm. per 100 Cc.	Per Cent	Per Cent	Gm. per 100 Cc.	Per Cent	Gm. Per 100 Cc.	Per Cent	Gm. Per 100 Cc.
Day												
1	23.0	140	14.4	88	18.8	115	114	18.7	85	13.9	140	23.0
2	21.3	130	16.2	98	18.05	110	111	18.07	94	15.4	135	22.2
3	22.2	135	13.4	82	17.2	105	110	18.05	85	13.9	140	23.0
4	20.6	125	13.4	82	17.2	105	108	17.7	85	13.9	135	22.2
5	19.7	120	12.0	73	17.2	105	105	17.2	80	13.1	125	20.6
6	20.6	125	12.5	76	16.4	100	112	18.4	90	14.7	135	22.2
7	20.6	125	13.1	80	16.4	100	106	18.2	80	13.1	130	21.3
8	19.7	120	12.3	75	15.6	95	100	17.4	78	12.8	125	20.6
9	19.7	120	13.4	82	15.6	95	97	15.9	80	13.1	120	19.7
10	19.7	120	10.8	66	15.4	94	95	15.6	75	12.3	120	19.7

TABLE 3

Erythrocyte Content in Series of New-Born Infants

	NORMAL		
Day	Maximum	Minimum	Average
1	8,000,000	4,200,000	5,800,000
2	6,400,000	4,200,000	5,500,000
3	7,600,000	4,000,000	5,200,000
4	7,000,000	4,800,000	5,000,000
5	6,800,000	5,000,000	5,000,000
6	6,500,000	5,000,000	5,100,000
7	6,500,000	4,400,000	5,200,000
8	6,000,000	4,800,000	5,000,000
9	6,000,000	4,200,000	4,800,000
10	6,000,000	4,000,000	4,500,000
	ULTRAVIOLET EXPOSURE		
Day	Average	Minimum	Maximum
1	5,800,000	3,000,000	8,000,000
2	5,700,000	3,200,000	7,600,000
3	6,000,000	4,600,000	8,000,000
4	5,900,000	5,000,000	7,600,000
5	5,500,000	4,500,000	7,000,000
6	6,000,000	4,200,000	8,000,000
7	6,000,000	4,000,000	6,800,000
8	5,500,000	4,500,000	6,500,000
9	5,000,000	4,000,000	6,000,000
10	4,800,000	4,000,000	6,000,000

Comment

In the normal series, the number of erythrocytes compares favorably with that found by other investigators.[18] The variations between the count in sexes was within the limits of technical error, and not worth recording.

The results of the determinations of the hemoglobin content are of interest. Other investigators[19] have reported extremely high values during the first week of life. It will be noted that while the maximum value compares with these high results, the minimum is much lower. The average is considerably lower than is generally supposed, although similar results have been reported by Lucas and others.[20] Two patients in the series were considered to be in a pathologic condition, and, therefore, the cases were not tabulated. One had a hemoglobin con-

tent of 40 per cent and 3,000,000 red cells; the other, a hemoglobin count of 45 per cent and 3,800,000 red cells. The physical observations in these infants were normal. Anemia in the new-born is considered rare, only five cases[21] being reported in the literature. My results in these two cases would indicate that anemia is not uncommon but is not diagnosed because a blood count is not made. Both infants gained normally, and examinations of the blood made eight weeks thereafter revealed: a hemoglobin content of 75 per cent, and 4,200,000 erthrocytes, and a hemoglobin content of 78 per cent and 4,400,000 erythrocytes, respectively. Both infants received treatments with the ultraviolet ray.

In the series of infants receiving treatment with the ultraviolet ray, there was a slight increase both in the number of red cells and in the hemoglobin content twenty-four hours after the first treatment. These results remained stationary for the next three days, and were slightly increased after the fourth day, following the last treatment. It must be emphasized that the results are a general average. Many cases did not show any increase, and a large number showed a decrease both in the number of red cells and in the hemoglobin content after treatment. It was necessary to treat a large number of patients to ascertain whether the general effect was one of an increased hemoglobin content and an increased number of erythrocytes.

Some of the results obtained were spectacular, and in one case a hemoglobin content of 85 per cent and 4,500,000 erythrocytes were increased to a hemoglobin content of 115 per cent and 8,000,000 cells after four treatments with the ultraviolet ray. Occasional bizarre increases were also observed in normal cases. The two infants with anemia responded well to ultraviolet irradiation. The hemoglobin content rose 20 per cent in one case and 15 per cent in the other, after four treatments. The number of erythrocytes was increased by 1,000,000 in each case.

It was impossible to follow many of these cases after the patients were discharged from the hospital. The few that had repeated examinations of the blood showed normal values. From these counts and the general downward trend of the results after treatment, it may be assumed that the hemoglobin content and the red cell count drop rapidly to a normal level.

These values may explain the different results obtained by investigators in the effect of light and darkness on the number of erythrocytes and hemoglobin content. It has been a popular belief that workers in mines or in darkness suffered from a decrease in hemoglobin content and number of erythrocytes. Blessing,[22] a surgeon on the Nansen expedition, did not find any change in hemoglobin content or in the number of red cells in his fellow members after their exposure to the long polar nights. Grober and Sempell[23] examined horses kept for from five to ten years in mines and did not find a decrease in the hemoglobin content and the number of red cells. As to the effect of sunlight on the hemoglobin content and number of red cells, Graffenburger[24], Marti,[25] Borrison,[26] Orum,[27] Aschenheim,[28] Koster,[29] and Laurens and Sooy all found a decrease in darkness and an increase in sunlight.

Considering that the effect of sunlight is probably due to ultraviolet radiation, results have varied as to the effect of ultraviolet radiation on the blood. Aschenheim,[30] Gelera[31] and Barenberg[32] did not find an increase in hemoglobin and red cells, while Miles and Laurens[33] did.

In my series, a large number of infants did not show any change and a considerable number showed a definite decrease in the number of blood cells and the hemoglobin content. The most spectacular results were obtained in those patients who had a low hemoglobin content and a comparatively low cell count. Hobart[34] has found that blood regenerates much faster in light than in darkness and still more rapidly under ultraviolet radiation. Tixier[35] has emphasized, however, that ultraviolet irradiation is effective only in secondary anemia in blood regeneration.

All these results would indicate a stimulation of the hemopoietic organs. The increase

in hemoglobin content during irradiation might be due to the decreased volume of blood resulting from loss of water from the blood during the first few days of life. As there is an increase in the number of red cells in cases in which the hemoglobin is increased, however, it does not appear that there is an actual increase of the hemoglobin content in individual cells. The subject of blood volume in the new-born is not well understood and deserves more study.

WHITE CELLS

This study is based on the observation on a series of 120 new-born infants during a period of ten months. The total white cell count and the differential count were made within six hours after birth, and at twenty-four hour intervals thereafter. The determinations were made at the same time every day.

The treatments with the ultraviolet rays were begun on alternate infants on the second day, and continued thereafter at the same time on each of the following four days. (See tables 4, 5, and 6.)

TABLE 4

Total White Cell Count in Series of New-Born Infants

Day	Maximum	Minimum	Average
NORMAL			
1	22,000	10,800	14,800
2	20,000	10,000	13,800
3	16,500	8,800	11,800
4	14,200	7,000	10,200
5	14,000	6,800	10,500
6	12,800	6,500	10,200
7	13,000	7,000	11,000
8	12,500	7,200	10,500
9	11,800	8,000	10,200
10	12,000	8,000	10,200
ULTRAVIOLET EXPOSURE			
Day	Average	Minimum	Maximum
1	14,000	10,500	21,800
2	13,500	10,000	20,500
3	14,800	9,500	20,800
4	14,000	8,500	18,500
5	13,800	7,500	17,500
6	14,200	8,000	18,000
7	12,000	8,000	16,500
8	11,500	8,000	14,800
9	11,000	8,000	14,000
10	10,500	8,000	14,200

TABLE 5

Differential Count—Normal

	Leukocytes						
Day	I	II	III	IV	Lympho-cytes	Myelo-cytes	Eosino-phils
1	40	28	2		19	10	1
2	36	22	1		28	12	1
3	30	24	2		30	12	2
4	26	22	4		32	15	1
5	28	18	4		33	15	2
6	20	19	5		38	16	2
7	20	13	7		41	16	3
8	18	14	6		44	15	3
9	15	10	9	1	45	16	4
10	12	13	8	3	46	16	2

TABLE 6

Differential Count—Ultraviolet

	Leukocytes						
Day	I	II	III	IV	Lympho-cytes	Myelo-cytes	Eosino-phils
1	38	25	3		22	11	1
2	37	21	2		26	12	2
3	26	12	13	2	36	11	
4	38	11	2		38	11	
5	34	12	2		44	8	
6	20	8			62	10	
7	14	4			70	12	
8	26	12			50	12	
9	23	16	5		49	7	
10	18	12	6		50	14	

Comment

In the normal series, the number of white cells compares favorably with that found by other investigators. The variations between the count in sexes were within the limits of technical error and not worth recording.

In the series of infants receiving treatment with the ultraviolet ray, there was a slight increase in the total number of white cells within twenty-four hours after the first treatment. This increase was in the mononuclears and lymphocytes, with a decrease in the total polymorphonuclear leukocytes. This result agrees with that of the majority of investigators.[36] It must be understood that the increase was the result of a general average. In some cases there was an actual decrease in the total white cell count, and many infants showed no change from normal. In general the most marked increases were in infants whose total white cell count was high, or in those who showed an early tendency to an increase in lymphocytes under normal conditions.

In the normal infant the character of the white cells begins to change on the second day, the so-called "birth leukocytosis" being replaced by the small lymphocytes. It is on such a system that the ultraviolet light appears to exert a double effect: first an increase in small lymphocytes and second a change in the types of leukocytes. Laurens and Sooy and later Gunn[37] were of the opinion that there was no constant change in the white cells following irradiation. Clark[38] attempted to explain these varying results by the hypothesis that wave lengths shorter than from 300 to 330 millimicrons produced a lymphocytosis but had no influence on the polymorphonuclears; those between 330 and 390 millimicrons decreased the lymphocytes and had no effect on the polymorphonuclears; those from 450 to 650 millimicrons stimulated both, while those longer than 650 millimicrons had no effect.

Miles and Laurens, using a carbon arc, found that light generally had the effect of increasing the lymphocytes and lymphoblastic cells. While different wave lengths of light may exert a specific influence on certain classes of cells, it would appear that certain stimulating influences within the hemopoietic system are more likely set at work by a general property of exposure to light. The system that is under the greatest tension would, therefore, be more greatly stimulated. Thus, in the new-born infant there is a normal increase in the circulating lymphocytes, which is further intensified by the ultraviolet light. Ilhan[39] found in giving erythema doses of ultraviolet light to children that there was a lymphocytosis at the expense of the polymorphonuclears, while in rachitic children there was an increase of the polymorphonuclears at the expense of the lymphocytes. Here under the same conditions, the health of the subject directly influences the effect on the blood picture, which corresponds to the results obtained in the new-born infant, when the more active system is consequently stimulated to a greater extent.

In the study of the differential count of the polymorphonuclears, according to Cooke's[40] classification, the cells are immature in the new-born infant. The single lobed nucleated cells or class 1, are greatly in preponderance, and no multinucleated cells of class 4 appear until the ninth day. The weighted mean begins at 1.28 and gradually ascends to 2 by the tenth day. This is a steady increase toward 2.74, the average adult mean. Classes 2 and 3 gradually increase at the expense of class 1 as the cells mature. In the differential count of the polymorphonuclears of the irradiated infants, there is a sharp decrease in the cells of classes 3 and 2, with an increase in class 1. Class 3 cells disappear for three days following ultraviolet irradiation, and then when the cells of class 2 have reached a suitable maturity, class 3 cells begin to return slowly to a normal value.

The polymorphonuclear population of the blood vessels is only a fraction of the whole population of circulating polymorphonuclears in the body. These cells abound in the extravascular spaces, from which they are continually entering the blood stream and into which they are continually passing from the vessels. The young cells of class 1, and occasionally class 2, are the only ones that are formed in the hemopoietic system. These later mature in the blood stream to the older cells of classes 2, 3 and 4. In the normal new-born infant, the life cycle of the polymorphonuclear has only just begun, hence the slow growth to classes 2, 3 and 4. The effect of ultraviolet radiation on this system is apparently to destroy the normal balance by stimulating the hemopoietic system to the excess formation of young cells of class 1, and to remove the older cells of class 3. Immediately after the first irradiation on the third day, one finds a few cells of class 4 that do not appear normally until the ninth day. This is followed by a loss of older cells in the upper groups, or an absolute disappearance of cells of class 3. The system probably attempts to keep in balance by adding new cells of class 1, which is not so apparent as it really is, because the total leukocytes are decreasing normally in the system of the new-born infant.

A similar unbalancing of the normal system has been effected by Ponder[41] by injecting thyroid extract into rabbits. Colchicine, nucleic acid and trypsin also cause a polymorphonuclear leukocytosis and a similar deflection of the nor-

mal count. Kennedy and Grover[42] have obtained similar results with single roentgen exposures, and Kennedy and Thompson[43] obtained a removal of the higher classes of leukocytes with a compensatory increase in young cells of class 1, by exposing rabbits to ultraviolet light.

It has been assumed that the principal blood-forming area was the bone marrow. In the injection of thyroid extract, or any of the hemopoietic stimulants, into the blood stream, the increase in young cells of class 1 could be effected by bone marrow stimulation. The bone marrow could also be influenced by the roentgen ray. The absorption of ultraviolet light from the skin is great, but the tissue penetration is only possible for a short distance, so that the bone marrow could not be greatly influenced. This would point more to a stimulation of the hemopoietic system to replace older forms destroyed, than to a mere formation of new cells.

SUMMARY

In fifty new-born infants short exposure to the ultraviolet light increased the bleeding time and the blood platelets. There was no effect on the coagulation time. Short exposures to the ultraviolet light would, therefore, serve as a therapeutic measure in infants with delayed bleeding time but their coagulation time would have to be decreased by other means.

Short exposures of 200 new-born infants to ultraviolet light increased the hemoglobin content and number of red cells to a slight extent, in an average number of cases. In cases in which the hemoglobin content and number of red cells are lower than normal, the hemoglobin and cells are increased to a greater extent, and tend to remain nearly normal.

Exposure of 120 new-born infants to ultraviolet light increased the total white count to a slight extent. The lymphocytes being increased at the expense of the polymorphonuclear leukocytes. The number of young or single lobed nucleated cells of the polymorphonuclear cells were incresed. The older or multilobed forms are decreased. There is a rapid return to normal.

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DISCUSSION

Dr. M. L. Blatt (Chicago, Ill.): I feel sure that all of you have, as I have, listened with a great deal of interest to this admirable piece of scientific work by Dr. Sanford. All of us who are specializing in diseases of children feel that there are gaps in our scientific knowledge of the effect of physical therapy, of actinic rays; in this particular instance of ultraviolet rays upon the blood of the individuals we are constantly treating.

Our attention, of course, was first directed to the problem by Finsen who, in his work with adults, found a gradual and constant rise in the count of the erythrocytes during the summer months, and by the more recent work of Eleanor H. Russell, who investigated and treated sixty children in an infants' asylum with ultraviolet rays in a manner somewhat similar to that done by Dr. Sanford. She also found that there was a steady increase in erythrocytes under treatment. Of thirty-one cases so treated the average increase was 400,000, and during the same period, under like hygienic conditions but without the use of ultraviolet ray, the increase was only 58,000.

Likewise, she found an increase of 8 per cent of hemoglobin in her children treated with ultraviolet ray and only 6 per cent in those not so treated. Dr. Sanford has distinctly added to our knowledge by going down in the scale to that of the new-born and deter-

mining for us the influence of ultraviolet radiation upon them. He has given the profession a highly scientific evaluation of the effect of ultraviolet radiation on the blood of the new-born infants. It has all the earmarks of a solid contribution, and will be a valuable guide in our future use of light treatment.

DR. H. E. IRISH (Chicago, Ill.): My first comment on the paper is that we are all happy to read it, inasmuch as it is a presentation of material in the field of research based upon observation of a large number of subjects upon which careful statistical data have been kept.

It seems to me that such progress as can be made in any field, and more especially in the field of physical therapy at the present time must be made upon such basis of pure research work as this particular paper exemplifies.

From a practical standpoint it seems rather interesting to speculate as to whether or not this treatment with ultraviolet rays will have a definite effect upon those hemorrhages which occur in the new-born.

As Dr. Sanford has stated, there is no increase in the coagulation time by this method, but there is a definite decrease in the bleeding time. It would seem, theoretically, that such a procedure might be of value. The thing that might operate against its practicable effect is that the increase seemed to take place after the fourth day. Those of us who have seen bleeding in the new-born know that the time for treating those cases is short; in other words, the patients succumb unless measures are brought rather promptly and adequately to their relief.

We have in the obstetrical department at Cook County Hospital a number of bleeding cases in the newborn in the course of a year. It has been interesting to know that certain of these cases have a normal clotting time but still continue to bleed. For the most part, the bleeding in the new-born is relieved by the use of whole blood or one of the coagulants such as thromboplastin. Whether this method applied early would have some definite effect is a question which must be left to clinical observation.

Another phase of his investigation that seems interesting to me from the standpoint of a possible clinical application is the marked increase in hemoglobin and in red blood cells and also in the white ones. It would seem that some of us can and will use ultraviolet ray exposures in the delicate and premature children.

The general applicability of this sort of work must be determined by subsequent clinical observations. I for one have received enough information on a subject new to me to make me wish to apply this sort of treatment both in the hemorrhage of the new-born and in premature, delicate children.

DR. HEYWORTH N. SANFORD (Chicago, Ill.): The purpose of these investigations is to open up, if possible, a more practical and direct therapeutic method in such conditions mentioned in my paper. Its purpose is to make it valuable in a clinical sense.

In regard to Dr. Irish's statement about the hemorrhage of the new-born, it is of practically no value in the majority of hemorrhages of the new-born in which you have an increased coagulation time. In those where there is a decreased platelet count, it appears to be of some value. Unfortunately, those are the very rare forms of the new-born, such as the purpuras and syphilis which, of course, have to be treated specifically anyway.

In regard to treating anemic new-borns with the ultraviolet light, I mentioned two cases, one of which had a hemoglobin of 40 per cent and red count of 3,000,000, and the other had a hemoglobin of 45 per cent and a red count of 3,800,000. I did not put those cases in these statistics. You occasionally find cases like that that you hate to put in because they throw the general trend of figures out of line.

It happened that we gave these chldren ultraviolet therapy. We continued it after the usual length of time. At the end of three weeks the hemoglobin had increased in the first case to 75 per cent, with 4,200,000, and in the second case to 78 per cent hemoglobin and 4,800,000 red cells. As far as the hemoglobin and red cells are concerned, we do get a definite increase.

I think that we should be a little careful in giving ultraviolet light, if any of us are tempted to do it, in infectious conditions, because, according to what we found, the increase in total white cells is due more to the destruction of the older cells (and the system itself forms new cells) than to the effect of ultraviolet light forming new cells. We might be in a dangerous position in an infection by trying to form cells in that way.

ELECTROTHERAPEUTICS AS APPLIED TO MODERN OTOLARYNGOLOGY*

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The scientist has named elements before their discovery, but the clinician must repeatedly observe results before he is justified in repeating them. I desire to give clinical testimony of the value of electricity in the relief of diseases of the ear, nose and throat. I shall leave to you their scientific explanation.

GALVANIC

The galvanic current finds its greatest usage as a stimulant. The facial muscles silenced by a Bells palsey are stimulated by its daily administration. The average case of hoarseness is caused by a spasm of the extrinsic and intrinsic muscles of the larynx. This may be due to over use of the voice or as a part of an acute upper respiratory infection. The best treatment for the relief of these contracted muscles is stimulation with the galvanic current by placing the anode over the back of the neck, and the cathode over the upper border of the thyroid cartilage where the superior laryngeal nerve is nearest the surface. The current is slowly raised and broken with each increase by manipulating the cathode. This same procedure is carried on at the lower border of the thyroid cartilage to stimulate the inferior laryngeal nerve. These procedures will contract the laryngeal muscles and with relaxation their spasmodic state is lessened. I have seen hoarseness helped immediately and at other times not influenced, but I have never seen the hoarseness made worse. If the vocal cord has a node or a papilloma upon it, galvanic stimulation cannot be expected to clear its hoarseness, but I have seen these cases made more comfortable and their voice less hoarse, after such treatment. If the vocal cords are the seat of surgery the laryngeal muscles will try to shield the cords by contracting, and during the convalescence galvanism will be of value by overcoming this contraction.

Metals are positive in their electrical charge and, therefore, are expelled by the positive pole and attracted by the negative pole. With this knowledge, we can see the rationale of zinc ionization in the treatment of chronic otorrhea. Zinc ionization will not replace surgery, but when non-surgical treatment is to be used, it has proven in our hands to be the most satisfactory therapeutic measure at our disposal. The method used, being a physical reaction, will depend for its success upon having the zinc solution come into direct contact with the pathological area. If the disease is limited to the middle ear and there is a sufficiently large perforation to allow the zinc solution to enter the middle ear and bathe the diseased membranes, the treatment will be successful. Otherwise, it is foolish to try it. The technic of zinc ionization in chronic otitis media is as follows: cleanse the canal and middle ear of all secretion and dead tissue. With the diseased ear lying uppermost the middle ear and canal are filled with a zinc solution (zinc sulphate grain 1 to an ounce of distilled water). The zinc, being positive, will be attracted by the negative pole, which is placed at a distance from the ear, and should be large enough not to concentrate the current. A small piece of metallic zinc is attached to the positive pole to be expelled in ionized form. This electrode must be well insulated and in the zinc solution. When the current is turned on, the zinc is converted into positive ions which, by the process of electrolysis, will migrate toward the negative electrode. In its cataphoresis (passage through the body) the zinc penetrates the diseased aural membrane and a maximum therapeutic action is obtained. The treatment should be repeated twice a week and in a month's time should show results or be dis-

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continued. The age of the patient is important, as cooperation is necessary to obtain a result. Infants can be held still by force for the fifteen minutes of treatment, but older children who will not lie still, are bad subjects for this form of therapy.

Galvanic treatment of paresis of the various cranial nerves is satisfactory when the nerve can be reached by the current. The effect of the cathodal closing will serve as a tonic to any one of the cranial nerves, and can be demonstrated to reproduce the special function of that nerve. Unfortunately, it was exploited as a treatment for optic atrophy, but the hopelessness of any result here is evident.

In the treatment of nerve deafness we find in galvanism a sensible procedure instead of nasal operations and eustachian catheterization. There are a number of tinnitus cases which are given relief by stimulating the auditory nerve. The toxic vertigo patients can be made comfortable by stimulating the less active labyrinth. The galvanic current can also be used to test the excitability of the vestibular branch of the auditory nerve in contrast to the labyrinth when there is a doubt as to the location of a lesion of the nerve and its end organ.

The tinnitus cases which are most frequently helped are those in which there is a marked response to the current. I have produced a tinnitus in some cases which passed away without any harmful results.

The technic of auditory nerve treatment is the same for its two branches. The external auditory canal is packed with cotton moistened with a salt solution. The contact with this cotton plug is made by having a large wet cotton pad over the auricle. The cathodal electrode is attached to this pad and the anodal electrode held to the opposite mastoid so that the current will penetrate the petrous portion of the temporal bone. By breaking the contact of the cathode a maximum stimulation is produced in the ear of that side.

FARADIC CURRENT

I have used the faradic current less than any of the other forms of electrotherapeutics. The older otologist tried vainly to shake loose the adhesions of the stapes with its oscillations.

RAYS

Infra-red rays are sedative in action and are of service in the treatment of sinusitis. They will increase the local action on intranasal packs when argyrol or ichthyol is being applied. The infra-red rays produce vosodilatation and hyperemia by penetrating the skin to beyond the superficial blood vessels, and are of value in the myositis of the neck.

Ultraviolet rays are stimulating and photochemical in their action. They increase the number of leukocytes at their site of irradiation and if exposed too long or in too massive a dose will produce a lethal action on the skin. The immunity produced locally in the skin becomes general by the blood absorption. The local skin diseases encountered about the nose and around and in the auditory canal are successfully treated by exposure to the ultraviolet ray. We have used the water-cooled rays to stimulate infected mastoid wounds or radical cavities whose healing surface had become sluggish. The greatest value in our hands of the ultra ray is its use within the nose during the convalescence from intranasal sinus operation. The dosage here should be increased dependent upon the amount of granulation tissue. If polyps have occurred before operation the dosage should be high, and the treatment prolonged, and this will often prevent the need of radium irradiation. We all have patients upon whom we have done more or less nasal operations that suffer with each acute rhinitis. The ultraviolet irradiation of the nasal membrane will give them relief, and supply the deficient local immunity. Hypertrophied lingual tonsils and pharyngeal lymph nodes are reducible by the massive action of the water-cooled ultraviolet rays.

ROENTGEN RAYS

Roentgen rays have been abused in their use and misrepresented in the reports upon their end results. Their action range from stimulating in small doses to destruction in the higher and massive dose.

Lymphoid tissue is very susceptible to the roentgen ray, and hence its successful use against

obnoxious lymph nodes and adventitious lymphoid patches. It has some effect on the bones of the sinuses and the mastoid, but its greatest value is to destroy lymphoid tissue. Its employment to remove tonsils has proven so uncertain that it must be condemned as a routine procedure.

The treatment of the chronic sinus case by deep therapy is of value if the most important factor is the hypertrophy of the sinus mucous membrane. Should the bone be infected or the process be one of deficient sinus immunization this form of therapy will not accomplish a cure. The frontal headaches called by Sluder vacuum headaches are helped by deep x-ray therapy. We have been using in our series three doses on succeeding days of 4 ma. with a filter of copper ½ mm. and aluminum 1 mm. at 20 inches for 15 minutes of 170 K. V. I have dried chronic discharging ears with roentgen therapy, but attribute its success here again to its action on the lymphoid tissue of the nasopharynx and eustachian tubes. We have treated several selected cases of acute mastoiditis with deep therapy with gratifying results.

The treatment of the subacute middle ear is dependable upon the results obtained on the lymphoid tissue of the nasopharynx and the mucous membrane of the middle ear, aditus and mastoid antrum.

The best result was obtained in a lad of 9, who developed mastoid symptoms as a complication of an acute upper respiratory infection. His left ear developed an acute abscess and examination upon admission to the hospital showed a small perforation in the posterior lower quadrant of the drum which had occurred without any severe pain. The nasopharyngeal lymphoid tissue was hypertrophied and inflamed. The nasal membrane was congested and there was a distinct postnasal discharge which was mucopurulent in character.

A roentgenogram showed the antra to be cloudy and a like study of the mastoid showed the two mastoid processes to be well developed and with pneumatization sufficient for his age. The left group of cells were cloudy, but did not show any necrosis of cell walls. The white blood cell count was 11,500, poly 82, small leukocytes 14, large monos 4. The temperature ranged from 100 to 102 degrees, with a pulse of 106 to 110, and the respiration rate was 22.

Three doses of deep x-ray therapy were administered: On the 9/10/29 ma. 4: Filt. Cop ½ mm.: Al 1 mm.: Dist. 20″: K. V. 170: Time 15 minutes: Area lateral to left mastoid. 9/11/29 ma. 4: Filt. Cop ½ mm.: Al 1 mm.: Dist. 20″: K. V. 170: Time 15 minutes: Area lateral to left mastoid. 9/12/29 ma. 4: Filt. Cop ½ mm.: Al 1 mm.: Dist. 20″: K. V. 170: Time 15 minutes: Area posterior to left mastoid.

The postnasal discharge increased and the pharyngeal lymphoid tissue lost its intense congestion. The middle ear abscess slowly receded and the lad made an uneventful recovery. In contrast to the above we have operated upon some of the cases that progressed in spite of radiation and at operation the mucous membrane lining the cells and antrum appeared to be more hypertrophied than usually encountered.

I have not had sufficient experience to express an opinion of the value of roentgen therapy in the treatment of deafness.

Our most frequent use of deep therapy has been in the treatment of acute cervical adenitis. It is the most satisfactory therapeutic measure in children that we have to relieve the distressing enlargement of the cervical glands. The administration of arsenic during the radiation is helpful. I have tried deep therapy with uncertain results in the aborting of peritonsillar abscesses, and deep cervical adenitis. If the treatment is begun before suppuration has developed it will ease the pain, and often stop the progress of the case. An example of this was seen in a man of forty, who the night of his tonsillectomy required a low stitch tie to control a persistent bleeder in the lingual pharyngeal angle of the fossa. On the fifth day he returned to the hospital complaining of dyspnoea. An examination of the throat showed an inflammatory reaction beginning at the site of the suture and descending down the pharyngeal wall. The right half of the epiglottis and the right arytenoid process were oedematous. Three doses of deep therapy stopped the suppurativ process.

PHYSICAL AND ELECTROTHERAPY IN OTOLARYNGOLOGY*

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Physical and electrotherapy may be divided into two classes. The first class includes the minor work which can be carried out in the specialist's office. By that I mean mechanical vibration, ultraviolet ray therapy, and superficial diathermy. The second class includes specialized treatments which can be carried on only by a physician who devotes all of his time to this specialty. I refer to specialized mechanical massage, deeper electric therapy of one kind or another, and particularly, x-ray and radium therapy. For example, if a patient comes in with a complaint of tinnitus aurium and I determine that it is probably due to a high blood pressure, the management of that patient should be placed in the hands of one who knows how to reduce the blood pressure. Purely local treatments would be of no avail.

When one considers the accurate dosages that are necessary in x-ray and radium therapy, there is no question that patients needing such treatments should be referred to the specialist in that therapy. I recall treating a patient, some years ago, for a pathological process around the eustachian tube. I decided that radium therapy was necessary and had a specially made catheter inserted into the nasopharynx. In all, she had three treatments. About six months later I received a letter from her, stating that her nasopharynx was so dried up that she could hardly swallow and that she was going to sue me for malpractice. Since that time, I have referred all such cases to the specialist in radium, usually to Dr. Herman B. Philips, of New York City. In his hands, this work has been most uniformly successful.

Otolaryngologists have found it necessary to install apparatus and apply them, simply because specialists in physical therapy are not available in some cities. In such instances otolaryngologists should not attempt to do this work themselves, no matter how well grounded they are, but should obtain the services of a mechanician whom they can properly train. No man who is busy in the practice of otolaryngology has the time or the inclination to perfect himself in this work. Certainly x-ray therapy and radium therapy are sufficiently dangerous for one to observe precaution.

I have stated that there are certain types of physical and electrotherapy which should be available in every well equipped otolaryngologist's office. I refer to various kinds of mechanical massage, violet ray, infra-red and diathermic treatments. The question now arises as to how much actual physical change is accomplished by the use of such treatments. Is the relief of the patient physical or psychological? Although, in our offices, we use such types of therapy daily, I am not convinced in my own mind that I am actually accomplishing anything of real value. In a conversation on this subject with an old time practitioner some years ago, the statement was made that, in the milder ailments (and these are the cases that fill our offices) nature would, in the course of time, cure seventy-five per cent of them and that the old time silver nitrate would cure the other twenty-five per cent. I do not wish to go that far, but I do not hesitate to state that most of the milder complaints soon cure themselves and that, except for serious complaints for which specialized treatments are necessary, most of the mechanotherapy and electrotherapy which I use could be discarded. I do not wish to infer that treatments along these lines are not necessary because the patient demands them and oftentimes the soothing effect of an infra-red lamp will quiet the patient as nothing else will. Let me cite an

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example of what I mean. A few years ago, I devised a mechanical apparatus for vibro-massage of the membrane tympani. Many an apparatus of a similar nature had been previously on the market but none of them was practical. The Comprex Oscillator, as my apparatus is called, can be precisely "tuned" to a patient and, after five minutes use, in cases of progressive deafness, a change in the drum can be seen. In other words, an increase in circulation has taken place. Many of my patients, who are dependent on their hearing for a living, claim that they cannot get along without using this apparatus daily and they actually think that their hearing is improved. Tests of their hearing, made with the audiometer, show that their deafness is the same. In other words, I have never seen an improvement in the hearing as a result of using this apparatus alone but as long as there is a psychological change in the patient and he or she thinks the hearing is improved, one has to be satisfied. Because of the fact that vibro-massage may be of some use, we continue the use of the apparatus and some men have written me that they are more than satisfied with their results from the use of the oscillator. However, I cannot conscientiously state that anything more takes place than a congestive process in the drum. The same reasoning applies in the use of such electrical devices as the violet ray and diathermic machines as used by the otolaryngologists. Photo and heat therapy from the simple lights, like the infra-red, seem to be very soothing and actually help to relieve pain.

Nasal Therapy

Aside from the ordinary congestive conditions for which patients come in for treatments, one has to deal with actual abnormalities which can be treated conservatively or by operation. It is in the former class that much can be done by specialized treatment. I shall take up only a few conditions—hypertrophy of the turbinates, sinus disease, particularly the acute types, ethmoiditis with the formation of polypi and atrophic rhinitis.

Hypertrophy of the turbinates. Generalized thickening of the mucosa over the turbinates, particularly the inferior, gives rise to a stuffy feeling in the nose with nasal obstruction which changes from one side to the other depending on the blood supply. Sacrifice of such turbinate tissue by extreme operative procedures may result in an atrophic condition and a complaint of extreme dryness. Of first importance is to get at any factors in the body system which may be causing the trouble. Some years ago, I pointed out that an engorged muscosa which does not shrink on the application of cocain and adrenalin was probably due to syphilis. Diathermy, applied every other day, may give excellent results but even better results are obtained by going back to the old time cauterization method. I use the platinum cautery more frequently today than I did years ago and find that the deep searing of the mucosa does a great deal of good. The cautery is also excellent in burning off fringes of tissue and in breaking down synechiae.

Acute affections of the sinuses should always be treated conservatively, even when the patient is in severe pain. It is seldom that the patient with a severe cold does not have some pain in one or more of the sinuses. It may surprise you to know that we never wash out an antrum in our office and that not one out of twenty patients who have definite sinus inflammation or infection has to come to the opening of the sinus. We have adopted a procedure which, apparently, is eminently satisfactory; the nasal mucosa is sprayed with an ephridin and cocain solution, 1%. A pledglet of cotton, having been immersed in the same solution, is then placed in either nostril in the region of the middle turbinates. The patient then sits in front of an infra-red lamp for fifteen to twenty minutes at one foot distance. We use a Zoalite. Formerly we employed the high-powered incandescent bulb but we did not get the phototherapeutic effect. At the end of the sitting, the cotton is removed from the nose and the nasal chambers washed out with a suction douche apparatus. In the washings, one can see the mucopus from the sinuses and often the hardened plug of mucous which has blocked the natural opening of the antrum. Our theory is that

shrinking the mucosa, increasing the circulation, etc., tends to widen the natural openings so that when the suction is applied with the douche, the sinuses are thoroughly washed out. It is needless for me to cite numerous cases. My own history will suffice. About five years ago, I was advised to have a radical operation upon my antra. X-ray pictures showed a definite pathological condition. Since that time, I applied this method of treatment on myself. X-ray pictures of the antra last year showed them perfectly clear. I have seen acute and persistent affections of the frontal sinuses cleared up in the same way.

Nothing has been more startling than the results that have been obtained in the *hyperplastic ethmoid conditions* by treatment with radium after operation. Like many others, I have operated upon patients with recurrent polypi, always having to tell them that there would probably be a recurrence. No matter how thoroughly the operation is performed, minute polypi still remain which will become large enough to cause trouble again later on. We have had a number of these cases treated with radium and the results have been uniformly good. One patient of ours had a severe asthma which I was able to clear up fairly well by nasal operation. But, every year or so, she would have to come back to me to have some polyps removed. Three years ago, I sent her to Dr. Philips for radium treatments. Since that time, she has not had one single attack. In all such cases, today, I do not attempt to do the radical operation I did formerly but rely on the radium treatments to get at the deeper parts.

The use of radium in the treatment of *atrophic rhinitis* is not so well known. I hesitate to definitely state that radium will cure all cases but, in the few instances in which it has been employed by us, the results have been miraculous. I shall cite one case. A child of five to six years came to see me some years ago with a beginning atrophic rhinitis and oezena. During the course of twelve to fifteen years, I saw her frequently. She was able to keep the nose fairly clear by douching it night and morning and applying a bland oil. But the distressing odor still remained. A test for syphilis was negative. Every known method for the treatment of atrophic rhinitis was tried but with no success and the condition finally became so bad that she would wash out crusts as large as the little finger. One can imagine how distressing this was to an otherwise attractive girl. Someone suggested to the mother that radium might do some good. I sent her over to Dr. Philips who applied the radium at bi-weekly intervals over a period of two years. As she was at school in another city, at times there were long intervals between treatments. Almost immediately after the first tratment, there was a change in the character of the secretion from the nose, and now, after three years, the nasal cavities are absolutely clean, the nasopharynx is clean and there is no odor. Examination of the inside of the nose, shows large nasal chambers covered with a clean healthy mucosa with no evidence of excessive secretion. I am not in a position to state the dosage at each treatment, but I do know what the results are and that the same results may possibly be obtained in other cases.

In certain types of cases in which there is an excessive secretion from the nasal chambers, tamponage of the nose with a zinc sulphate solution and the application of zinc ionization is of great benefit. I do not think that ionization has the support which it deserves. In other cases, packing the nose with tampons of 10% argyrol or 5% neosylvol and applying diathermy by placing the electrodes over the nasal bones gives relief.

Throat Therapy

Although infection is the basic condition in most throat affections, there are certain generalized inflammations which cannot be reached by ordinary forms of medication. I refer particularly to the ordinary nasopharyngitis, pharyngitis, and laryngitis. Etiologic factors must be eliminated and then local treatments given. Tonicity of the mucosa is the point to be reached. After thorough cleansing of the mucosa, these parts should be treated externally by means of diathermy and internally by means of the ultraviolet ray from the water-cooled lamp.

Diathermic treatments are given by placing the electrodes on either side of the throat at the upper triangle of the neck. The current is turned on until the patient receives between 300 and 600 milliamperes of current. The electrodes are left in position for about fifteen minutes. The patient should always be in control of a cut-off switch so that he can end the treatment at any time if it is at all uncomfortable. Ultraviolet therapy is applied in those cases in which a resistent type of infection is present or in Vincent's angina. The treatments should be graduated. The first treatment should last one-half a minute and each day the treatment should be increased one-half a minute until the maximum of three minutes is reached. One should remember that the quartz electrode can give a very severe burn resulting in an ulceration which is sometimes harder to cure than the original condition. Such treatment is particularly applicable to acute conditions of the larynx. A curved electrode of quartz can be used for this purpose.

X-ray therapy is of particular benefit in certain conditions of the nasopharynx, especially prevalent in children. During the course of the winter, a child will develop a recurrent fever with slight swelling of the cervical glands. Examination of the throat will reveal the presence of lymphatic nodules on the pharyngeal wall, extending into the nasopharynx. Two per cent mercurochrome dropped into the nose twice a day will help the condition but will not cure it. As soon as the temperature has subsided, these patients should undergo x-ray treatments. These are given for a period of six minutes on either side, at bi-weekly intervals. After four or five treatments, one will note that these lymphatic nodules have disappeared or have become smaller. There is seldom a recurrence of the symptoms in the following years. We have had a number of such cases and have been much gratified at the results.

Comment must be made here on the desiccation methods which are being advocated for the removal of tonsils. A few good machines for doing this work are on the market. In my text-book, written a few years ago, I made the statement that I had seen tonsil operations performed in all parts of the country by competent men. I had seldom seen a poor operation performed and I had never seen two men do the operation in the same way. Some specialists prefer the clean dissection; others prefer using a modified tonsillotome. I suppose others, in the future will prefer to employ endothermia. I shall have no criticism to make of the use of any apparatus or method provided the operation is well performed. From the surgical point of view, I cannot see any advantage in removing the tonsil by the cautery knife. Certainly one cannot maintain that less bleeding takes place for one seldom encounters bleeding of an annoying character today, especially when the operation is performed under local anesthesia.

In carcinoma of the larynx, x-ray and radium therapy are of paramount importance. Naturally an early diagnosis is necessary and, at that early date, operative procedures may cure the condition. But, when the disease has gone on to the stage where the entire larynx is involved, with metatases in the glands of the neck, surgery alone is not even palliative. In such cases, I advise that a tracheotomy be performed and that further treatment be instituted with x-ray and radium until a definite subsidence in the growth and the surrounding tissues takes place when, possibly, operation may be performed. Radium implantations into the hypopharnx and larynx may set up an intense congestive process so that it is always better to see that a tracheotomy is performed first.

Aural Conditions

Conditions within the ear canal may be much benefited by the use of electrotherapeutics. Otitis externa or actual furunculosis may be benefited by the employment of heat and zinc ionization. Many patients present themselves with a complaint of itching in the canal and an exfoliation of the epithelium. Such patients may be much improved or cured by cleaning out the canal, making a direct application of a 2% silver nitrate solution, packing the canal lightly with a cotton tampon containing some soothing oil, such as equal parts of chloretone inhalant and albolene and then placing the affected ear in front of an infra-red lamp for fifteen to twenty minutes.

We have been treating beginning furuncles and many cases of chronic purulent otitis media by means of zinc ionization. The procedure is very easy and, I think, worthy of trial. The apparatus is so simple that one can use ionization in any place where he can get a galvanic current. We make use of an ordinary rheostat to which are attached the zinc and copper electrodes. The ear canal is filled with a five per cent zinc sulphate solution and the zinc electrode inserted until the contact is made. The current is turned on (the opposite electrode being held in either hand) until the patient feels an appreciable warmth. The treatment should last from ten to fifteen minutes.

No more baffling problem is presented to us than that of increasing deafness. It is difficult for one to realize that most of these cases of deafness have started in early childhood and that little more can be done, in the majority of cases, than keeping the patient from becoming worse. Of course, once in a while, a miracle is performed and the hearing is actually improved. In all cases one must delve into general etiologic factors and correct these general conditions as well as local ones. With the means for accurate examinations which we have at present, there is no reason why one should not come to a definite determination as to the best type of local treatment to be given in any individual case.

The acute otolaryngologist will make an examination with the nasopharyngoscope on all patients who complain of deafness. Oftentimes he will see a pathology in the nasopharynx which is worthy of note. He may see a polypoid infiltration of the posterior tips of the inferior turbinates, a marked congestion around the mouths of the eustachian tubes with actual thickening of the membranes, adhesions in the Fossae of Rosenmuller, lymphoid infiltration of the mucosa or masses of adenoid tissue. It is most difficult to treat these tissues by surgery. One may remove the posterior tips of the inferior turbinates by means of the snare but I would be most thankful if someone would invent a loop which could be attached to an endothermy machine so that one could use the cautery knife under direct vision with the nasopharyngoscope in the other nostril. Adenoid masses may also be removed surgically but the two other conditions may be relieved considerably by means of electrotherapeutics.

We have frequently found that it was impossible to treat the eustachian tube because of the marked congestion. For such cases, we have had made a glass electrode, covered over with thin silk (so that if the electrode breaks, there will be no danger) of the same shape and size as the ordinary eustachian catheter. This is inserted into the mouth of the eustachian tube and violet rays applied for five to ten minutes. Frequently a tube which was markedly congested, opens up and we are able to pass applicators and bougies into the middle ear.

Considerable discussion has taken place during the past ten years as to the value of x-ray treatments in cases of chronic, progressive deafness. In the beginning, so many promises were made that could not be kept that unfortunately this method of treatment, in selected cases is not used as often as it should be. I wish to state that direct treatment lies in its effect upon the mucosa of the nasopharynx. If one finds that there is a glandular infiltration of the mucosa of the nasopharynx, such granulations often extending into the mouths of the eustachian tubes, the best treatment he can advise is x-ray treatment. Such treatment should be given through the upper triangle of the neck and should be continued for six minutes on either side. Treatments should be given every two weeks until eight or ten in all are given. The otologist should not complicate matters by applying any medication at the same time. We have had a few cases in which the hearing has very definitely improved after such treatment, as evidenced by audiometer tests and where further treatment from us has hardly been necessary.

There are two other types of treatment which we feel are of value. In many of our cases, we use diathermy directly through the auditory canals. The canals are filled with a water soaked tampon and a head piece applied so that the electrodes are directly in contact with the tampon. About five hundred to seven hundred and fifty milliamperes of current are used

and the treatment lasts for about twenty minutes and is repeated twice a week. We cannot definitely state that such treatment in itself accomplished any result because we are using other therapeutics at the same time. The other treatment which we give is vibratory massage by means of the Hays' Comprex Oscillator. Many machines for giving this type of treatment have been placed on the market, but, for some reason or other, they are mechanically imperfect. My machine gives a definite vibration which can be measured for the individual patient. Vibrations, up to eight thousand per minute, may be given if desired and the amount of impact can be measured by a special, simple device. A Y-shaped piece of tubing connects the patient's ears to the machine. The treatment is continued for five minutes at each sitting and repeated as often as possible during the week. Although we are unable to state that the Comprex Oscillator does anything more than set up a mild congestion of the drums, we do feel that it is a valuable addition to our armamentarium.

In treating inflammatory or infected conditions of the mastoid, one can hardly feel that operation can be avoided when definite retention has taken place; but certain adjuvants to treatment are worth while. One is quite used to the idea of applying heat or cold over the mastoid process and has often seen pain relieved in this way. However, I do believe in certain cases, operation has been avoided by the application of direct rays either from a high powered electric bulb or from an infra-red light. Treatment of this kind is simply given even to infants and very young children. One can suspend the light above the crib on a rod or cord and the treatment given to the affected ear while the child is asleep.

I wish to conclude with the statement that physical and electrotherapy are of the utmost importance in the treatment of diseases of the nose, throat and ear; that, although many of the simpler forms of treatment may be given in the office of the otolaryngologist, specialized forms of treatment should only be undertaken by the man who is constantly doing work in this field. It is unfair to the patient to do too much or too little and only the expert is in a position to determine the exact dosages necessary to get the desired results.

DISCUSSION ON PAPERS OF DR. SHEA AND DR. HAYS

DR. M. H. COTTLE (Chicago): The proofs of the clinical effects of zinc ionization are well stated in Friel's new book which has recently come off the press. The experimental evidence is cited in detail to show the chemical and bactericidal actions of zinc ionization. These experiments may be repeated by anyone interested in this work.

Dr. Hays' paper is comprehensive and includes a discussion of various phases of the whole subject. In general, the conclusions have impressed me with the fact that Dr. Hays thinks much more highly of physical methods than he is willing to admit. The fact that he employs electrotherapy as an adjunct to other procedures is in itself a direct commital of his favorable evaluation of these newer measures. We agree that scientific application is necessary. We agree, furthermore, that every method has its indications and limitations. That physical therapeutics has been and is wrongly condemned is due to irrational and unscientific application. Technic is an important factor, more so in otolaryngology than in the other specialties.

DR. NOVAK: It seems that most of us have gone through a period of doubt as to whether the methods employed in physical therapy are primarily psychological effects or physical effects. Yet I believe the preponderance of evidence in our experience must definitely take the result out of the field of psychotherapy and into the field of physical therapy.

I was greatly pleased to see the conservatism with which Dr. Hays views the subject of otolaryngology. It wasn't very many years ago that every subacute sinus, ethmoid, frontal and antrum, was treated radically. You, perhaps, recall a meeting held in Chicago, some years ago, at which, I think, Dr. Hays was present. The entire discussion was devoted to the subject of sinus disease. The conclusions of that entire day, devoted to nothing else but that subject, were that conservatism is the proper thing. Radical surgery of sinuses, except in extreme cases, is a thing of the past. We see reflections of that on all sides. We see it here this afternoon in Dr. Hays' paper. There isn't a young man who has gone into the field of otolaryngology within the last five or ten years who hasn't punctured hundreds of antrums. They proudly boast of the faciltiy and ease with which they open numberless maxillary sinuses. Dr. Hays says that the antrum washing in the office is a rare occurrence. It isn't necessary in many instances to wash out a maxillary sinus. I agree with him entirely.

If I understood correctly, he does not offer any strong criticism of the treatment of tonsils by surgical diathermy. In this I must disagree with him. I thing desiccation of tonsils is a method adapted to only

a very small percentage of all cases, to those which are rightly labeled inoperable. Otherwise, I think, it is a pernicious procedure, as I have stated many times before. In carcinoma of the larynx, Dr. Hays says that where the involvement is not only intrinsic but also extrinsic, in the so-called massive tumor, radium and x-ray are employed more or less as palliative measures. I don't know of any procedure which has greater palliative value in these extreme cases of carcinoma of the larynx than diathermy. I can appreciate what radium and x-ray does not accomplish. The pain and distress increases after radiation. There is a futile attempt by radiation to cure the patient. Although you cannot cure many of these cases with diathermy, you can prevent pain; you can make the patient comfortable. You can increase his days. I believe that diathermy is the agent of choice in these massive inoperable involvements of the larynx.

Dr. Hays brought up the treatment of furunculosis of the external canal. There are many methods of treatment of furunculosis of the external canal. It is a minor ailment, though the patient suffers a great deal. I believe that most of the procedures which are used, at least in my hands, are of no avail. The affection runs its course and the patient gets well. He probably has a recurrence. Perhaps most of you are acquainted with the work of Besredka of the Pasteur Institute. Besredka has developed (and his work has been substantiated widely) a vaccine. By means of this vaccine he immunizes the skin. That is the big point of the whole procedure of Besredka. It is a local tissue immunization. He applies the vaccine directly to the skin, not subcutaneously. By means of vaccine we have a method of treating external otitis or furunculosis of the external canal which is a successful treatment.

Dr. Shea (Memphis): The use of zinc ionization is a chemical reaction and a great deal depends upon getting the canal clean and keeping it clean. That, I think, is the basis of the success. We have used various remedies for cleaning out the canal and keeping it clean between treatments. Our method is to give two treatments a week, and if at the end of a month we haven't had success, this type of treatment is discontinued.

Dr. Hays (New York City): Years ago I used to feel that the men who were puncturing antra were, from the physical point of view, doing that a little unnecessarily. In other words, the majority of the men used to think that when they punctured an antrum and washed it out they were washing the antrum out through the canula. Of course, this is not true. You are forcing fluid into the antrum through the cannula and you can't get anything out through it. What you actually do is this: By forcing liquid in the cannula you dislodge the plug of mucus or pus in the natural opening and your washing comes out through the natural opening. Then it occurred to me to place the patient in front of an infra-red lamp for fifteen or twenty minutes and remove the cotton plugs which had been immersed in the solution. The way we work it is this: We have a large glass irrigator over our washstand and it is connected to the cold water faucet. The solution is put in there. We use any kind of mild alkaline solution. One tube is connected with one nostril and the other with the other nostril. The second tube is connected with a gauge which tells exactly the amount of pressure used. There is no more pressure used than in Dr. Proetz' treatment of sinuses. The patient is upright with the head in just a comfortable position over the sink, not too far down. You would be amazed to see the amount of pus we wash out of those antra. We actually see the plug which comes out of the natural opening.

Let me give you an illustration of what that amounts to. There was a very prominent laryngologist in New York who was in the habit of opening the antrum of almost every patient who came into his office. He did any number of operations in the course of a day. A patient came in one day who had had both antra punctured thirty times in thirty days. He was absolutely demoralized. When I looked into his nose after the first washing and told him that I never would have to puncture his antra, he couldn't believe it was possible. We managed to get out over one ounce of pus from the antra at the first washing. That was three years ago and that man has never had his antra washed out since. You would find those sinuses clear on transillumination. I do not say there aren't antra that have to be opened up, but certainly not as frequently as it is being done.

I am glad that Dr. Novak took such a definite stand on the desiccation of tonsils. I am of the same opinion as he is, but I hesitated to put it that way in my paper.

I haven't had any experience with diathermy for carcinomas of the larynx. I treat very few cases myself anyhow. I feel as Dr. Boot, that when it comes to the question of doing laryngectomies, it is pretty serious. I want to send those cases to the man who specializes and who knows how to take care of the after treatment, which, after all, is the very important thing.

I am glad that Dr. Novak mentioned the question of the use of the Besredka method of treatment of furunculosis of the ear canal. About five years ago, I read a paper before the American Medical Association on the use of local vaccine in nose, throat and ear work. I did some research work along these lines and found that by the use of Besredka's vaccine we could clear up various kinds of skin conditions. It appealed to me for use in nose and in ear work particularly. We have used local vaccines which are made up by simply taking a culture from the affected part, immersing the swab in a solution of broth or bouillon, allowing it to grow for forty-eight hours and then killing the bacteria by ordinary high heat. Then we use the bouillon as a local tampon. We have had some excellent results.

I wish to close by saying that I hope we shall be able to continue our investigations on the various phases of electrotherapeutics as applied to otolaryngology. There is a big field for scientific work in our specialty

and the work already done should act as an impetus to those who find in physical therapy, interest and enthusiasm to continue their research.

Dr. F. L. Wahrer (Marshalltown, Iowa): I was much interested in what Dr. Shea had to say concerning galvanism, especially concerning its use in hoarseness. I have never used the galvanic current in these cases, but intend to try it on my next case. I have had some very nice results in Bell's palsy with the use of the galvanic current combined with high frequency stimulation.

I agree with Dr. Shea concerning zinc ionization. It is satisfactory only in certain selected cases. Those with large central perforations, and practically no bone necrosis, will show good results.

Infra-red heat gives excellent results wherever we have swollen and inflamed tissue or a congested mucous membrane. Its effect is hyperemic, sedative and bactericidal. It has an unusually high range of usefulness in otolaryngology.

I am fully in accord with Dr. Shea's remarks concerning the removal of tonsils by x-ray. It will undoubtedly shrink lymphoid tissue, but it will not remove the tonsil. Its use in shrinking inflamed and swollen adenoid tissue in acute purulent otitis media would seem feasible, although in some cases it might prove to be too slow. It is my practice in these cases, where mastoid involvement seems imminent, to remove the adenoids surgically. I have never seen any bad results from this procedure.

I was sorry not to hear Dr. Shea mention the use of diathermy in chronic catarrhal otitis media. This procedure has given me the best results of any of the physical agents in otolaryngology. If Dr. Shea has not had any experience with diathermy in these cases, I will suggest that he give it a trial.

TRIBROMETHYLALCOHOL (AVERTIN) ANESTHESIA IN ELECTROLOGIC SURGERY OF THE HEAD AND NECK*

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The advent of electrocoagulation and desiccation has proven to be a major asset in our constant endeavor to cope with malignant disease. This new method has already influenced and changed our concepts of what constitutes an operable or inoperable lesion. The advantages of these types of destructive currents in the management of a malignancy need no comment, as they are apparent to all that have taken the interest to investigate them. Cushing has aptly remarked that surgery is a conservative art and that it has been slow in adopting the principals of electrosurgery.

One of the reasons for the reluctance of some in using these curents lies in the hazard of explosion. Consequently the use of the orthodox inhalation anesthesia is contra-indicated. Of course, local anesthesia is available, but when the surgery is of a very extensive nature or upon an individual with emotional tendencies it is not to be entertained. The use of ether by rectum has been suggested. It might be stated that rectal ether was first introduced by Piragoff in 1847 and since has been reintroduced several times. The uncertain rate of absorption a consequent variability of the resultant anesthesia has prevented any wide-spread use. Gwathmey has modified the use of ether by the rectum by dissolving the ether in oil and at the same time or a little later administering hypodermic injections of morphine and magnesium sulphate. He claimed that the synergistic activity of these various depressants produce a favorable anesthetic. Since the introduction of this method in 1912 it has not been accorded any noteworthy degree of enthusiasm, except in the realm of obstetrics. Indeed, within the past two years pharmacologic studies have been reported that seriously question the actual presence of any synergistic action. As far as surgical procedures about the head and neck are concerned, Beck and his associates were the only ones to give the method any extended trial. One of us (M. R.

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G.), in his association during the last five years with Dr. Beck has had the privilege of giving a large number of these synergistic anesthetics. Although the resultant anesthesia was good in a number of the cases, a good portion necessitated the use of a complimentary local or inhalation anesthetic. One noteworthy feature that was distinctly disconcerting was the extreme postoperative malaise. The patients were ill, constantly nauseated, given to vomiting, and took several days in which to recover. In addition they were prostrated for a longer period of time than one observed in similar cases performed under local or orthodox inhalation anesthetics. On the whole, while the so-called synergistic anesthesia was a decided advance over previous methods of administering ether by rectum, its drawbacks were of such a nature as to prevent its universal adoption.

The search, however, for a more successful rectal anesthetic has continued, and recently Willstater and Duseberg have elaborated a new compound, tribromethyalcohol, also more popularly known in the German literature as Avertin or E107, one that bids fair not only to supplant ether in rectal anesthesia, but as a general one also. It has been used in over 100,000 recorded cases without a single fatality attributable to the anesthetic.

It was the good fortune of one of us (J. R. G.), while associated with Professors Kummel and Sudeck at the Surgical Clinic of the University of Hamburg to give it in several hundred cases and observe its usefulness over a period of two years and then introduce it into this country in October, 1928. The first surgical procedure carried out on this continent under this new anesthetic was an esophagoplasty performed by Dr. Joseph C. Beck, and to him we desire to acknowledge our indebtedness for furnishing the major portion of the operative cases that have been subjected to tribromethyalcohol anesthesia in this country. He immediately became keenly aware of its peculiar fitness as an anesthetic of choice in surgical procedures about the head and neck. Its lack of explosability and success as a rectal anesthetic made it highly desirable when dealing with malignancies of the head and neck by electrosurgery and was adopted by him and his associates for this work.

Tribromethyalcohol, or as it is popularly known by the trade name of Avertin, is a white crystaline substance. It is easily soluable in water at 40° C. When heated to about 50°C. it breaks down with the formation of dibromacetaldehyde, a highly irritating substance. It is rapidly absorbed from the rectum, about 80 per cent within twenty minutes, and is eliminated by the kidney in combination with glycuronic acid. It causes a very rapid induction of anesthesia without any preliminary excitation. The lethal dose as compared to the therapeutic or anesthetic dose, shows a therapeutic index of 1.7, which is higher than that of ether or chloroform. It has no effect upon the mucous membrane of gastro-intestinal tract or conjunctiva. In common with other anesthetics it slows the respiratory rate, but to a much greater degree, but the respiratory efficiency is maintained by an increase in the tidal volume. Increase of respirations was easily effected by the use of caffeine, carbon dioxide and lobeline. There is a fall in the systolic blood pressure and a slight rise in the pulse rate. No cardiac changes were observable by means of the electrocardiograph. Any fall in blood pressure could easily be compensated for by the use of ephedrine. Laboratory animals injected with several anesthetic doses daily and repeated day after day showed no injury to any organ. Some that received over 100 inductions in a period of four months gave birth to normal litters.

The dose as given per rectum varies from .08 to .15 gram per kilo body weight. The smaller doses are used to induce a state of mental obtundation without loss of consciousness with loss of memory for all events that transpired during the anesthesia. It is in reality a decided improvement over the scopalomine-morphine type of twilight sleep. We have used the drug in this manner in many cases of electrocoagulation, about accessible malignancies about the head and neck in highly neurotic patients. It is also the method of choice in dealing with electrocoagulation in malignancies of the larynx by direct laryngoscopy or suspension after the method of Novak. It should be stated at this

time that electrocoagulation by this method does not compare with laryngectomy, in our hands at least, in so far as permanency of results is concerned.

The larger doses produce an anesthesia with complete loss of consciousness and thorough relaxation. Any procedure may be carried out under it. We have used it on every type of malignancy occurring in the sinuses, tongue, palate, tonsil, pharynx, pyriform fossa, epiglottis larynx, external nose, cheek and eye lids. Due to the relatively smaller number of these cases seen in private practice and to the short period of time in which we have used Avertin (ten months) in these cases we have purposely omitted a detailed tabular report.

The purpose of this communication is to serve to introduce this anesthetic and call attention to its many admirable characteristics for electrologic surgery about the upper portion of the body. As it is given by rectum the presence of an anesthetist about the head is unnecessary and the surgeon is not bothered by an extra person or inhalation masks and tubes being in his way and impeding his procedure. The danger of explosion is absent and so the use of electric currents with the attendant sparking may be employed without fear. From the patient's viewpoint the anesthetic is without equal. At first glance this may seem to be an unusually strong statement to make. Those, however, who have had the opportunity of observing this anesthetic are all unanimous about two things. First, the peaceful induction without the strangling sensations, coughing, retching, and other phenomena that are dreaded by the patients in the orthrodox inhalation anesthetics; and second, the peaceful awakening without any nausea, vomiting or feeling of depression and sickness. Our patients who have had other anesthetics have all commented about these two features, and in practically all cases the statements were voluntary on their parts. It is not at all improbable that these two characteristics may have a great deal to do with the supplanting of our usual general anesthetics in favor of Avertin in the future.

DISCUSSION

Dr. Galloway (Chicago): I have been concerned about anesthesia, and I do not believe we have yet found the ideal anesthetic for that work. It has been a great problem and we are ever in search for something that gets the anesthetic out of our way, holds the patient quietly and allows him to relax, and allows us to use the spark without danger of explosion.

I have used chloroform, ether, and avertin and I have seen misadventures with every one. I saw an avertin case have a very beautiful anesthesia. We were able to remove an extensive carcinoma very satisfactorily. A second patient with carcinoma was an old man with miocardic degeneration. We supplemented the avertin with a little ether, because the patient was not relaxed and it was hard to do the suspension; perhaps the interference with his breathing at that time had a good deal to do with his cardiac failure.

At first I used chloroform, as Dr. Boot did, but there were too many bad results. This work is done at the County Hospital on patients who have extensive involvements of malignancy. They are bad risks at the start, but are treated because they are entitled to every means at our command to afford them prolongation of life, if not cure. I used also intermittent ether, but found that very unsatisfactory; the anesthetic was not smooth; the patient vomited and moved. The operation consumed a great deal of time and hemorrhage was always a little more bothersome, even in electrosurgery.

The successful cases we had came out of the avertin quickly and had no bad after effects. I think the unsuccessful case I saw cannot be charged to the avertin.

You may know that the Lilly Company of Indianapolis has had under investigation for at least two years a preparation called sodium amytal for intravenous use, obviously, a more dangerous introduction than by rectum. You cannot recall anesthesia if you get too much, whereas in the avertin, ephedrin may restore blood pressure.

The anesthesias I use have not been so satisfactory as caloric ether, although the after results have been good. I think, perhaps, given by an expert, avertin is the best of them all.

RADIANT ENERGY AS APPLIED TO SKIN LESIONS*

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Every new department of science as it expands defines not only its own practical field, but also evolves a philosophy peculiar to itself. Radiant energy is of such value in treating skin lesions that a dermatologist must largely be a physiotherapist. Piffard, Pusey, MacKee and Kingery illustrate this through their outstanding contributions in roentgen therapy. Particularly MacKee has studied the roentgen ray and simplified its application. Due to him, it is possible to know no more about the machinery used than a driver does about an automobile, and still be a safe therapist if his instructions are followed. The value of his work is quite outside the domain of pure physics. Other forms of radiant energy have been similarly studied and their use codified, and the same is true with regard to certain kinds of physical therapy not classifiable as radiant energy, but which will have to be referred to in connection with radiant energy before the end of this treatise. Radiant energy will be discussed in terms of the roentgen, grenz and ultraviolet ray. Red and infrared rays and radium will be omitted; the first two because little is yet known of their value in skin therapy, the third because radium seems to be restricted in utility to certain neoplasms and nevi, and is thus of only technical interest.

The theme, moreover, dwells on the effect of radiant energy on skin lesions. To cause involution of a lesion is not invariably, not even often, to cure the disease of which the lesion is a sign. Nevertheless, a skin disease is frequently spoken of as cured because it disappears. This may be true, and the patient thinks it is, but biologically no such assumption holds. It is sound and forthright to regard the control of a lesion as nothing more than the control of a lesion. A disease is a life process. A lesion is evidence in tissue of such a process, and since the factors conditioning disease may be active without demonstrable lesions, it is fallacious to conclude that when a lesion disappears its causation has likewise disappeared, except with regard to nevi, benign neoplasms, primar malignant neoplasms, primary malignant neoplasms after due time for metastases has elapsed, and restricted infections, and then only with qualifications.

Although much is known today of the causation of many skin diseases, the sum of well grounded beliefs and precise knowledge is trivial compared with what is still unrevealed. This at once explains the baffling nomenclature in dermatology, and the fact that skin therapy is still largely empiric. Through trial and error certain valuable procedures have been discovered; more, indeed, in this manner than through analysis and set experiments. The result, however, is gratifying. A thoroughly serviceable art of treating the skin exists, which includes the skilled use of radiant energy.

It is easier to master the technic of applying radiant energy than it is to master the indications and contra-indications for its employment, precisely as it is easier to inject syphilitics than to know how to treat them. Standardization of methods, in itself desirable in many ways, has the common disadvantage of regimentation, of reducing to formulae matters that should remain individual and inspired. It enables the pseudodermatologist—the inadequately trained dermatologist—if he can equip himself with the required machinery, to treat dermatoses by rote if he only knows enough to do no harm. Radiant energy is of signal value in treating many dermatoses. The roentgen ray remains the form in which this value is best expressed, but the art and science of employing this agent is knowing where not to use it. It is precisely in this respect that the greatest offenses are committed.

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The conditions in which the roentgen ray is valuable are numerous, and in a few it may be regarded as the outstanding therapeutic agent. Moreover, it is only fair to add that the roentgen ray is more extensively useful than any other agent, physical or chemical, in treating skin lesions. But there are several qualifications of these statements. In the first place, it is assumed that the operator is mechanically skilled, aware of the indications and contra-indications involved. Second, he must know what the expectancy of relief is in various skin lesions. For this reason he must be a sound clinician. Third, he must not use the ray impulsively, but as a reasoned out procedure in conjunction with other treatment, and perhaps only after the failure of other treatment, for the total possible dosage of the roentgen ray is restricted. It is no unlimited hope. As it were, it must be regarded therapeutically as the ace of trumps, and not be utilized lightly.

There are five groups of practitioners using the roentgen ray in the treatment of skin lesions; adequately trained dermatologists, inadequately trained ones, roentgen therapists with more or less insight into dermatology, general practitioners, and finally, indirectly, general practitioners sending patients to one of the first four groups with instructions as to the treatment to be applied. The first of these, namely, adequately trained dermatologists, will have a crisp classification of conditions in terms of their responsiveness to roentgen ray. My own experience leads me to believe that it is the remedy of choice in acne vulgaris, the lymphatic infiltrations, Kaposi's sarcoma, and for producing epilation in tinea of the scalp. It is important in selected cases of psoriasis, lichenification, lichen planus, plantar warts, pruritis of the genitals and anus, chronic patches of scaling eczema, seborrhoea and some types of tuberculosis and pyodermas. It is contra-indicated in telangiectasis and atrophy since it disorganizes elastic tissue. These two categories of skin lesions are essentially the result of elastic tissue changes. Acne vulgaris will nearly always disappear under roentgen treatment provided the patient is over fifteen years old and under twenty-five or so. Nothing equals the roentgen ray for the lymphodermas and the sarcoma of Kaposi. In children thallium acetate may replace the roentgen ray for producing alopecia in tinea. With very slight modification, I believe the above outline would be accepted by any well trained dermatologist, although perfect accord cannot be expected. In all other dermatoses there may be occasions to attempt to get relief through this agent, for, when baffled, any straw may be grasped at. It is important, nevertheless, to realize it when it is only straws that are being reached for.

It is the inadequately trained dermatologist who finds too many straws and is always at them by instinct, or without justification. During the past ten years interest in dermatology has enormously increased, as indicated by the great number of men entering the field. For every new dermatologist who starts in properly trained, a half dozen are launched merely with a knowledge of clinical diagnosis and a ready hand to set motors a-humming. Therapy has undergone such standardization (what with simple formulae like MacKee's) that it may be almost redundant to get a substantial training in dermatology in order to be a dermatologist. The public, certainly, has no criteria to distinguish between a real and apparent mastery of the field. The two types of practitioner, so far as the public is concerned, have licenses to practise, conversance with the jargon peculiar to dermatology, and resources necessary to own the equipment for treatment with radiant energy. Moreover, the instinct of self preservation (for the pseudodermatologist will do no gross harm even if he does little good) safeguards the community from obvious disaster, since disaster of this sort would register itself in diminished income to the materialist. So he plays a safe if not conscientious game.

The harm he does, however, is twofold. In the first place his patients are not getting the most thoughtful treatment available. In the second place, so far as the roentgen ray is concerned, the total safe dosage being limited, if it has been squandered, a valuable agent may later have to be withheld at what may prove to be an important juncture in treating a chronic derma-

tosis. It is chiefly because of this that the roentgen ray should never be employed unless everything else has failed, except in those conditions in which it is supreme. It is for this reason, too, that such treatment should never be begun before the operator has found out if the patient has had any previously, a matter of first rate importance in psoriasis and other obstinate or recurring conditions. Confronted by this dilemma the scantily trained dermatologist is exposed, for, bereft of the plumage in which he seems the equal of his superiors, namely, his machine, he stands bare.

Unless the roentgen therapist has a real insight into dermatology he presents the liabilities of the poorly trained dermatologist and general practitioner using the roentgen ray in treating skin lesions. For this reason the third and fourth groups may be discussed together. The discussion will be short since it may be reduced to the plain utterance that no physician should undertake what he is incompetent to do well. The issue is one of conscience and this paper is no sermon. I merely wish to add that no specialty exists with which any ordinary physician cannot become conversant. Nor does it follow that a physical therapist or general practitioner may not also be a sound dermatologist. What has been said does not apply to such exceptions. It is only a matter of the individual's training, not what he styles himself.

Therapeutically speaking, dermatology has become so identified with roentgen therapy that both practitioners at large and the lay public appear to think that all dermatoses are amenable to this form of radiant therapy. Hence a great number of patients are referred by their physicians to be treated by this means. The seasoned dermatologist will not be bulldozed, but the unseasoned one and the roentgen therapist, if he knows no more about the field than the physician who refers the patient, are likely to be more complacent. What might be added here has been stated before. The fault lies in part with errors in judgment made by sound dermatologists, together with their comprehensible enthusiasm about a useful agent. It lies more, however, with modern philosophy.

The indications and contra-indications for roentgen therapy have already been stated in terms of clinical diagnosis. They may be restated, however, from another aspect. Young undifferentiated cells and gland overactivity, as well as certain infections, are inhibited by this form of energy. The effect on young dividing cells is shown in epithelioma, particularly the basal cell type, sarcoma of Kaposi, other sarcomata, the lymphodermas, mycosis, psoriasis, seborrhoea, chronic eczema, lichen planus and some other scaling dermatoses. The effect on glands is illustrated in acne and some types of excessive sweating. Acne is due to scaling in the sebaceous follicle forming a comedone when the scales are saturated with sebum from the plugged overacting gland. The comedone is the essential lesion of the disease. The pustule together with its results, is incidental. Thus in acne, through alleviating comedone formation the roentgen ray exerts its effect on young cells, and, in diminishing sebaceous secretion, its effect on gland tissue. The infections more or less amenable to this ray are sarcoid and granuloma annulare, and at times lupus vulgaris, which are tuberculous, rhinoscleroma, actinomycosis, perhaps blastomycosis, furunculosis and some forms of skin tinea. There is no evidence that this ray is parasiticidal. It probably affects the inflammatory cells. An unexplained phenomenon is the antipruritic action of the ray in some cases of vulvar and anal itching.

The roentgen ray is also used to produce epilation in tinea of the scalp. In proper dosage it causes transitory alopecia, the fungi being mechanically removed with the hairs. Permanent alopecia as for hirsutes, should not be attempted. The margin of safety between the destructive dose and that required for permanent alopecia is too narrow to warrant the risk. In this connection must be mentioned a method of treating superfluous hair by a form of radiant energy advertised as not being the roentgen ray which is exploited by a chain of establishments called the Tricho Institute. Since the after effect of their treatment often produces regressive changes in the skin just like those following an overdose of roentgen ray, it is likely enough, by axiom one, that the advertisements are misleading. This

is mentioned to illustrate the danger of the procedure. The medicolegal phases of the matter need not be touched on.

Overdosage of the roentgen ray primarily produces dilatation of the capillaries in two ways. The ray has a great affinity for elastic tissue which it injures both in the vessel walls and in the cutis. Thus the vessels dilate and the cutis tends to atrophy, as in scleroderma. Moreover, the ray also injures connective tissue and, in a measure, the epidermis and skin adnexa, that is, the glands and hair follicles. In this manner dermatitis and artificial senility of the skin may be produced. If the injury to these tissues is sufficient, necrosis occurs leading to ulceration, or a condition arises resembling sailors' skin or exoderma pigmentosum, ending in roentgen cancer. The sequelae of overdosage with the ray should stimulate caution in its use, especially in chronic dermatoses and in dermatoses of which the importance does not justify the risk.

Curtaneous lesions other than those mentioned are often treated with excellent but inconsistent results. Commoner lesions which do not yield to the ray are xeroderma pigmentosum, nevi, benign epithelial neoplasms like ordinary warts, molluscum contagiosum, pityriasis rosea, parapsoriasis, inveterate lichenifications, rosacea, lupus erythemotosus, scleroderma and other atrophies, and xanthoma. Now and then squamous cell epithelioma, plantar warts, lupus vulgaris and juvenile warts respond. In other and rarer dermatoses the rays are either not to be applied, or are attempted in vain.

The facts mentioned in the four preceding paragraphs are basic and cannot be ignored. I believe there would be no essential difference of opinion regarding them among seasoned dermatologists. There are, nevertheless, curious inconsistencies in the effect of the rays. Psoriasis lesions tend to disappear under them, while parapsoriasis, which is a more superficial lesion resists them. Ordinary lichen planus lesions vanish under such treatment, verrucous ones remain untouched. At times, of two cases of chronic eczema clinically identical, one will rapidly respond, the other will resist or get worse. Even dissemination of the lesions may occur under roentgen treatment. Ordinary warts are resistant, plantar warts often respond, basal cell epithelioma more often responds than not, but recurrences are frequent. The ordinary wart is a simple epidermal hyperplasia, all elements being present and properly developed for their various strata and stages of maturity. This probably explains the resistance of the lesion to the roentgen ray.

But this is not the only reason. The ray has great penetrability and perhaps the dosage of softer rays required to affect the epidermis might do so disastrously, whereas in lesions benefited by them the more penetrating rays are what are needed. These facts, together with those referable to clinical and histological data constitute the knowledge an expert must have in order to use roentgen therapy conscientiously and with skill. It is just these that half trained dermatologists have not assimilated. Unless physical therapists and general practitioners are sophisticated in dermatology they are incompetent to treat skin lesions. The practitioner referring patients to any of the above with specific directions is presumptuous.

The scientific approach to treating a dermatosis is medical. What the skin disease may be called is not important. Its cause is, and likewise an understanding of the histologic nature of the lesion. From these, as well as from accumulated experience, can be calculated what the expectancy of resolution may be in terms of known therapeutic measures. Internal and external causes, the bulk, nature and structure of the lesion must be as precisely outlined as biologic incertitudes permit. This is the only intellectual approach. If the use of the roentgen ray is decided on, the decision must be based on this, not on embarrassment or because of intellectual inertia. Even so, the decision may be wrong, but at least it reflects mentality superior to that of a gambler or a blind follower of a vogue.

A few experiences will illustrate what is meant. A man with generalized eczema stated that the lesions had originally been on his groin and were regarded as due to tinea. A course of

roentgen therapy seemed to provoke generalization of the eruption from which he was eight months in recovering. A recurrence took place. A second dermatologist, without listening to the patient's story, insisted on roentgen treatment which was declined. Thereupon the man consulted me. He had urinary symptoms pointing to renal calculus. The right kidney was found to contain a calcareous, antler shaped stone, which had reduced the organ to an infected shell. Twenty-four hours after nephrectomy involution of the eruption began, was complete within a week, and no recurrence had been noted in a year and a half, the last time I saw him. A woman with pruritis vulvae which resisted prolonged treatment with the roentgen ray was found to be suffering with diabetes. Under suitable treatment the itching disappeared. To have forced irradiation in these cases, to have overlooked their medical aspects, would be an abuse of radioteharpy.

The Grenz ray is Bucky's contribution to the study and application of radiant energy. The ray lies between the ultraviolet and roentgen rays in the spectrum, and physically is a long wave-length ray, which it has also been called. Its isolation and use are the result of the efforts of Franz Schulz, Albers-Schoenberg, Zehden and others seeking a method of isolating soft roentgen rays. But Bucky determined the place, physics and utility of the ray named for him. It has also been called supersoft roentgen ray, oversoft roentgen ray and infra-roentgen ray. The first of these three designations is Eller's, the last Bucky's. Bucky prefers the name Grenz ray, by which it is known throughout the world, in spite of Eller's attempts to introduce the characterization he sponsors. Just what is gained by this either in understanding of the physics or application of the ray or in any other respect, is difficult to grasp. The term Grenz ray (border ray) is short, states a physical fact, and hence is apt, and unless a substitute can be found that has these attributes, and at the same time properly bestows credit on Bucky, it has no place in our vocabulary or in the annals of American medical chivalry.

Regarding Bucky's recognition, whatever the final judgment may be as to the Grenz ray's value, Bucky's priority is a fact. Like Eller, scores of others have devised apparatus. Bucky worked out the scientific and therapeutic essentials, the biologic aspects of the method, and nothing has been added by anyone, anywhere, save what commentators invariably add to anything new in medicine. By what mechanism the voltage and other factors necessary to evoke Grenz rays are evolved is a factory detail. Roentgen rays are roentgen rays, Bucky rays are Bucky rays, irrespective of who designed the different machines that produce them. Favorable and unfavorable views have been published. Apparently the Grenz rays will play an important role in therapy. Their penetration is less into deeplayers, their diffusion greater in upper layers of the skin than that of ordinary roentgen rays. In some conditions, as in basal cell epithelioma of the eyelids, their value is undisputed, as is stated even by Eller, whose conservatism about the Grenz ray is softened by his sponsorship of a machine liberating identical irradiation but under another name. Eller is qualified to speak with authority on the subject since he was one of Bucky's earliest American pupils. Emulation is flattery. Therefore we must conclude that Eller's pallid approval of Bucky is to be ascribed to scientific restraint because of his own later participation in the field.

Martenstein, of Breslau, has been Bucky's most eloquent adverasry. He asserts, as Eller also does, that the Grenz ray is a type of roentgen ray, something never denied by Bucky, who also calls it the infra-roentgen ray. Bucky merely contends that in proper dosage and by virtue of its definite physical characteristics, it exerts effects on tissue the more penetrating roentgen ray does not exhibit. Possibly in overdosage it would similarly affect elastic fibres. In histological specimens I have seen the effect on the elastica is transitory in human beings and seems to be so in rabbits. The very point of Grenz rays, however, is that they accomplish results foreign to the roentgen ray, if they are employed within the limits Bucky has set. If they are used for longer or are made harder they are not Grenz rays but roentgen rays. It would be gratuitous to condemn Grenz rays for effects produced when they are no longer Grenz rays,

and subject to further study, this seems to me to be just what has been done. An English translation of Bucky's work is now available to American readers who will thus be in a position to instruct themselves in the method and accept or reject it after first hand study. In Europe the view is held that the ray is a valuable agent in skin therapy. It is not necessary to take sides on the issue of whether it will replace the roentgen ray or not. In fact there is no such issue. My own belief is that the fields of the Grenz ray and roentgen ray will become defined, and that neither will have to be crowned at the expense of the other.

The ultraviolet ray seems to be an agent of limited utility in treating skin diseases. Leaving out angioma serpiginosum, which is rare, and alopecia areata, in which it has some value, the ultraviolet ray does nothing that cannot be as well or better done in some other way. It does not compare with the roentgen ray in acne or psoriasis and has no value in the infections or neoplasms, save the Finsen ray which stands out in the treatment of lupus vulgaris.

A discussion of radiant energy in the treatment of skin lesions resolves itself into a comparison of the roentgen ray with other forms of therapy. Destructive measures are superior to the roentgen ray for neoplasms. Nothing equals the roentgen ray, however, in treating the lymphatic infiltrations of the skin and in acne, with this reservation, that failure in so treating acne is encountered, and that the lymphatic infiltrations sooner or later become unresponsive to any treatment, for they are fatal diseases. The roentgen ray simply postpones the inevitable. In all other conditions enumerated the roentgen ray is a desirable aid, but should be used only after study and together with other therapy. The roentgen ray affects the lesion. To control the disease as a process requires other measures in addition. In part the Grenz ray functions ambiguously in treating skin lesions. Radium is inferior to the roentgen ray in conflicting fields, so far as skin lesions are concerned. The ultraviolet ray, save as noted above, is valueless.

In short, the roentgen ray up to the present moment retains unchallenged supremacy among the forms of radiant energy which can be employed in treating cutaneous lesions. Its disadvantages are not within itself, but inhere in the easy manner in which so standardized an agent can be administered. If physicians do not cautiously employ their machinery their fresh approach to the vivid problems of medicine will fade. The uppermost group of expert dermatologists will necessarily disappear if they can easily be replaced by the mediocre. It has been so in all human activities. Those with superior endowment gravitate, whither their talents receive acclaim or reward, and desert careers in which there is no particular advantage in possessing unusual capacity. If superficial gains are confused with fundamental conquests such as construing the effect on a lesion with the control of a disease, and any technician fulfills public demands, the public will get only technicians, and at times that it needs generals will find nothing but corporals at its disposal. The remedy lies in apprizing the public that it can have nothing superior to what it demands. Patients need but ask their physicians why they suggest radiant energyin preference to other forms of treatment and the reply will promptly reveal if it is guided by intelligence, expediency or embarrassment. On the part of the laity exaction will neutralize abuses; on the part of physicians conscience and resourcefulness will.

DISCUSSION

Dr. C. H. Warfield: Dr. Highman has brought out some very important points in his paper that I think should be seriously considered. He has told us the importance of really knowing your subject before you initiate treatment. It is not an infrequent thing for a doctor to send me a patient with some form of a skin lesion and ask me to treat it. You question the patient and you find that he has never received any form of treatment whatever and he expects you to treat him. I feel the same as Dr. Highman does about the high value of x-ray. The x-ray is his ace of trumps to be used as the last thing.

In regard to the dosage of x-ray for different skin lesions, I am quite in sympathy with MacKee's formula. I think MacKee's point of view was all right some years ago, but I think we ought to pay a little more attention now to the R-unit. The R-unit is something that is now becoming a physical standard. They are trying to work it out on a physical basis and some very important work, I know, will be published this winter

on the biological effects in association with the R-unit. We know very well that the erythema tells absolutely nothing. Each patient has his own R-Unit. Most of the therapists now are talking not about erythemas but tolerance dose. Tolerance dose seems to be a more appliacable word than erythema. Our conception of radiation therapy has changed materially in the past few years.

To say that for one disease you give so many grains of medicine is as unscientific as to say that in certain skin lesions you give the same amount of x-ray for every patient. Each disease is practically a law unto itself, and its treatment must vary accordingly. You can't lay own a definite standard. You simply have to watch these patients and work the treatment out carefully.

I believe that radium plays a valuable part in dermatology, because the dermatologist does use it in epitheliomas with success. I have worked out a plan of treatment which I like very much. This gives the patients about fifty per cent of a tolerance dose of x-radiation over the lesion. In about two or three days, I remove the lesion bodily with surgical diathermy, and in two or three days following I treat them with radium. I utilize radium plaque for about two minutes, five grams. Following that considerable necrosis of the skin takes place. Ultraviolet radiation is included for its local sterilizing properties. I have seen some good results.

CHAIRMAN LAKE: Before opening this paper for general discussion, I am going to take one of the prerogatives of the chair to say just a word or two myself. One expression that Dr. Highman used should be engrossed on velum, I think, or something of that sort, and hung up in the office of every physician in this or any other land. NO PHYSICIAN SHOULD ATTEMPT WHAT HE IS NOT QUALIFIED TO DO WELL.

If we would all of us remember that very carefully, it would be a big boost in the regard and respect and esteem in which the medical profession of this country would be held.

Another thing, I am convinced that physicians in general have too strong a tendency to consider themselves scientists. Medicine is not now and, I trust, will never be more than fifty per cent science. It will always have to be at least fifty per cent art, unless the human race develops into a collection of robots. The scientist wants to know *how* things take place and his work is highly and necessarily valuable. But this isn't all of it. I think that we, as physicians, should spend more time and thought upon ourselves as philosophers, and attempt to know *why* things take place.

So I recommend for your consideration these words of Dr. Highman, which I have repeated for you, and also the idea of thinking more and reading more and meditating more about the philosophy of medicine. I dont have to urge you to look upon the science side of medicine because that has been hammered home to you in all the medical meetings and in all the medical journals, but more of the philosophy of medicine will make us better clinicians.

DR. EDWIN N. KIME (Indianapolis, Ind.): I want to endorse, of course, what Dr. Highman and the chair have said with regard to the competency of each man to do the work he has undertaken.

I was a little disappointed in this paper in that it did not cover the entire field of radiant energy, as I felt, sufficiently thoroughly. There is no doubt but that the shorter wave lengths of radiant energy are more destructive in effect and much more important in the treatment of dermatological conditions. However, I should have been pleased to have heard the doctor give a comparative evaluation of ultraviolet radiation in skin condition in which x-ray might also have been utilized and of value, particularly with reference to the allergic dermatoses of childhood.

I have seen ultraviolet radiation give splendid results, along with proper determination of the allergic factor. The ultraviolet radiation, by the way, should be not only locally applied as the dermatologist would insist upon doing, but the patient should be studied from the standpoint of his entire general bodily mechanism; his vegetation, nervous system particularly; if that is done—if adrenalin, thyroid extract and the proper elimination of the proteidogenous anaphylactic material is taken care of—these patients will get well.

I have seen patients' eczemas of childhood which have resisted treatment for months and even over a year, respond within a very brief time to the proper administration of quartz light, taking into consideration these other factors which I have mentioned, particularly along the line of the utilization of these agencies which are of importance in stimulating the sympathicotropic mechanism.

DR. E. P. ZEISLER (Chicago): I think Dr. Highman's message is one that is of extreme importance to all of us who are using roentgen or any other form of physical therapy in our practices.

He has brought out very well the point that I think is of the utmost importance, the man who owns a roentgen machine isn't necessarily the man who is qualified to treat. There is a tendency among many practitioners, I think, to circumvent the dermatologist. They refer a case, often without a diagnosis, directly to the roentgentherapist, and the result is that neither the diagnosis is correctly made in many instances, nor is necessarily the treatment a proper one. Only too often do we see a tertiary syphilitic lesion which is treated with roentgen therapy.

Dr. Highman has brought out not only the fact that roentgen therapy is the most valuable agent we have in the treatment of skin diseases, but I think he should have emphasized probably some of the more dangerous features of the situation. As I understand it now, it is very difficult for those who are using roentgen therapy in practice to obtain protection from lawsuits and, in many instances, recently, in which physicians have been involved in cases of x-ray burns, the mere fact of the burn has been brought out as *ipso facto*

evidence that there has been some serious breach of technic, and damage suits have resulted against the physician. Right here in Chicago a prominent physician who devotes his time to dermatology suffered a serious loss through a suit which was brought against him on account of an x-ray burn which, possibly, may not have been his fault. Too often patients will use irritating local applications or go to some other physician. A strong ointment or roentgen ray is applied, and the result may be irreparable damage.

I think we all must agree with Dr. Highman that the proper use of roentgen ray requires years of study and years of training, but one must have a thorough knowledge of dermatology in all its aspects in order to use the x-ray.

Dr. C. F. Voyles (Indianapolis, Ind): I should like to ask Dr. Highman if he has had experience with the water-cooled ultraviolet in such a case as tinea circinata.

Dr. Highman: I was glad Dr. Warfield brought out the criticism he did with reference to the MacKee method of dosage, or rather the early pioneer work which was of such great value in standardizing the roentgen ray treatment. I think that Dr. Warfield is quite correct when he says that in his estimation the biological effect of any form of radiation by erythema is crude. When MacKee first elaborated this idea, of course, it was a step forward. Dosage in terms of R-units is unquestionably the basis on which our future criticisms and criteria of the value of x-rays, or any form of radiant energy, will be measured. As a matter of fact, if we do deal in terms of R-units plus the biological effect of the physical nature of the rays producing them, namely, the length or shortness of wave lengths, the difference, in fact, between ultraviolet rays, Grenz rays, and the various modalities of x-rays going up the scale, the shortest wave length types that we use will have two coefficients by which we can, in our discussions, come to terms and understand each other.

As a matter of fact, it is Bucky's work in Europe that has so largely made it necessary for us to think in these revised terms, together with the fact that x-ray therapists throughout the world are thinking of x-ray less as some sort of little "ism" shot from millions of little atoms controlled in space, but more in terms of something that is measurable by a rational unit of measure, namely, the R-unit.

I think Dr. Warfield did us a service in bringing it to our attention.

I should like to discuss Dr. Lake's remarks more at length, but I can't because this is a meeting of physical therapists. I should much rather be in a meeting of medical philosophers. I feel they do more ultimate good than we will ever do, because I think what medicine sadly lacks is the philosophical point of view. We Americans for three centuries have been so busy chopping down pine trees and making clearings and fighting Indians we have just become aware of the fact, first, that there is medicine; and second, that there is a philosophy.

Unquestionably, until we cease to think of medical results—I don't care whether you are using digitalis, ultraviolet light or x-ray—in terms of the good effects on one side, subtracting or adding on something, and then determining by the margin whether it is good or bad—in other words, thinking about it in terms of kindergarten arithmetic, we will never progress in medicine. If we can become imbued with the idea that medicine is an art and given over to endowed institutions that it might become a science if you live long enough, and have unlimited resources to kill guinea pigs in the hope of finding out something that may have some bearing on human medicine, in spite of the fact that guinea pigs aren't people, we would do well to follow Dr. Lake's idea and stick to the philosophy and art of medicine rather than science, and think of the medical problems in terms of humanity rather than in terms of statistics. Those institutions which with pride show you their filing cabinets and say, "This year we will have our 558 thousandth case in ten years," or "our ten thousandth case" of something or other, aren't contributing to medicine, I don't care how big the institutions are.

I think if you use the ultraviolet ray on the average case of infantile eczema, when a child is two or three years old, you will find that the average case of infantile eczema inevitably will disappear, because that is when they go spontaneously. I have never seen infantile eczema benefited by ultraviolet, x-ray, a pediatrician or a dermatologist. At the most you can perhaps ameliorate the itching of the child. Keep his finger nails cut. To give the thing a name, dermatologists call it allergic eczema. All disease is due to the fact that your tissues are peculiar in the respect that they can get that disease or can't get it. If they are susceptible, they are called allergic.

Now, as a matter of fact, assuming that it is allergic, it means a hypersusceptibility to an infinitesimally small amount of irritant. The disease will automatically disappear if the irritant is eradicated. To speak of the volumetric illumination, which is something one-thousandth of a milligram can produce, the disease seems to be breaking a butterfly on the wheel. If the assumption is correct, that is, the pathogenesis of the thing Dr. Kime is talking about, you wouldn't hear anything about the ultraviolet and its effects to produce the potential results he had in mind.

As to Dr. Zeisler, I ascribe his eloquence more due to the fact that we are close personal friends than because I merit it.

As to Dr. Voyles' question, tinea circinata, I assume he means of the body or the head.

Dr. Voyles: Of the body.

Dr. Highman: You can cure the average case quickly by applying a ten per cent suspension of chrysoborin in chloroform leaving it on for twenty-four hours. I have never seen a case fail after a few successive applications. If there is a slight dermatitis; subsequently a little zinc ointment will bring relief. I see no objection if you like the ultraviolet rays. I never

should have thought of applying in ordinary body tinea.

In regard to tinea circinata, whether treated by thallium acetate, with proper x-ray doage or pulling the hairs out until the child is bald is an open question, but x-ray is the most convenient and is not dangerous if used correctly. I have never had any experience with ultraviolet radiation at all under the conditions Dr. Voyles speaks about. It might be better than I think it would be.

THREE SUCCESSFUL CASES OF OSTEOMYELITIS OF THE FLAT BONES*

A Commentary on the Effect of Balneotherapy in Accentuating the Natural Healing Processes

W. ENGELMANN, M.D.
BAD KREUZNACH

A former colleague of mine, a trusty and experienced physician, recently sent three patients to Kreuznach for a course of balneotherapy more or less as a last resort, since he had known good results in similar cases. They all presented a comparatively rare clinical picture and in spite of a bad prognosis they were completely cured by balneological treatment without the aid of any other therapeutic measures worth mentioning. Since these cases offer an insight into the mechanism of balneotherapy in general and into the separate phases of its action on the skin, they seem to merit a short communication. The histories supplied to me by my colleague in the course of correspondence were as follows:

Case 1. Young girl, suffered from a large granulating wound of the right frontal and temporal bones; at the bottom was a hole the size of half a crown, showing strongly-pulsating dura. She had had several operations. She also suffered from tuberculous disease of the right ramus of the mandible, with actively-suppurating fistulae, and from disease of the right clavicle and sacrum with abscesses and fistulae. After several courses of treatment at Kreuznach the patient regained complete health and became a picture of *robust girlhood*.

Case 2. Lady of 46, from Mors, had had severe headaches for many weeks and when she came for advice presented a marked, slightly-fluctuant swelling of the right frontal bone, encroaching on the temporal, and a similar condition in the right clavicle and the sacrum. Profiting by my experience of Case 1, I sent her to Kreuznach, with *striking success*.

Case 3. A married woman, had suffered thirteen weeks earlier from violent pains in the left frontal bone. A specialist had diagnosed suppuration of the frontal sinuses but had operated twice and found nothing. When the patient came to me she had typical tuberculous osteomyelitis of the frontal sinus; she was very ill and terribly emaciated. J. sent her immediately to Kreuznach; she returned six weeks later the picture of health. When she came to visit me last year from Dresden, where she now lives, she was a completely *robust, healthy woman*.

The notes I myself made on cases 2 and 3 are as follows:

Case 2 was a lady of 46 with thickening of the bones of the head, sternum and pelvis. As the swelling increased the pain in the thickened parts increased correspondingly and the headaches became almost intolerable. Her general condition was very much impaired and she lost all pleasure in life. She took analgesics and hypnotics regularly and her hair rapidly turned gray. Her condition seemed hopeless; all kinds of remedies were tried, including ultraviolet light, baths, Pondorf and other forms of irritant therapy, and all sorts of drugs. Directly she began brine (natural potash and soda) baths, her

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pains were dramatically relieved. At first there was a slight reactive increase of symptoms, but this was followed by diminution of swelling and distress and return of general physical powers. After thirty baths the patient was discharged practically cured; she required no further treatment and a few weeks after the beginning of the secondary effect she informed me in a letter that she was quite well. Next year, when she came for a prophylactic course, she was healthy, looked much younger, took an active joy in life and was capable of doing her work.

Case 3, a replica of Case 2, was sent by the same colleague soon afterwards for a course of brine baths. She had a swelling of the forehead, and a lesion as large as the palm of the hand, which was suppurating profusely from intense pain and her general condition was so bad that she and her husband had practically given up hope. The husband had been told by various doctors who had treated her that there was nothing to be done and no prospect of recovery. Six doctors in a large town had had her under their care; her frontal sinus had been opened several times and every conceivable measure had been tried. Finally she consulted my colleague, who held out some hope, and the husband brought her to me, though without much confidence, mainly from the feeling that it was better to do something than nothing. Under balneological treatment the profuse suppuration—after a preliminary exacerbation—decreased in the usual way. The concentration of brine in the baths and parenteral injections was gradually increased. Suppuration diminished and new granulations appeared, the wound became smaller, the swelling more indolent and the patient became stronger. After six weeks the lesion had completely cleared up and she was quite well. A year later she wrote to thank me and said her health remained satisfactory.

Although no accurate clinical investigations were recorded and no Wasserman test was made or x-ray taken, there is no doubt about the diagnosis or the similarity of the three cases.

A famous Berlin pathologist writes to me:

"Tuberculosis of the flat bones is somewhat rare. It occurs most commonly in the bones of the skull; according to Kaufmann in the frontal and parietal. Sometimes it seems to originate in a tuberculosis of the mucous membranes and accessory sinuses, sometimes in the bone itself or in other bones. Personally I have seen very few cases. The prognosis is relatively unfavorable on account of the danger of involvement of the meninges. I gather from the data provided that these cases belonged to this class. Removal of a small piece of tissue would have made diagnosis certain."

It is remarkable that all three patients were women.

The Mechanism of the Therapeutic Bath

Balneologists have tended in recent years to pay more attention to the mechanism of balneotherapy than they used to. All spa practitioners have for a long time agreed to look upon it as a form of irritant therapy, and this explanation is the one given provisionally in the text books. The stimulus produced by the salts in the bath acts on the skin, which is an endocrine organ of an enormous superficial area containing end-organs belonging to the vegetative system. By altering the vegetative tone it rapidly sets up reactions within the body which cure the condition by correcting the pathological changes which have occurred in the cells at the disease focus. The natural processes of healing are stimulated by a mild—by no means an acute—activation of the protoplasm; one which it is correct to term physiological. Schober has drawn a graphic parallel between the vagotonic activity produced by therapeutic baths and the vagotonia of youth, which is directly opposed to the sympathicotonia of old age and its increasing disposition to disease. The bath is therefore literally a fountain of youth.

Groedel compares the mechanism of balneotherapy with that of ray therapy and speaks of "balneological stimulation of the cells." It is probable that Bucky's border-rays act in a similar way; he believes that they stimulate the autonomic nervous system and has, in conversation with me, compared their mechanism to that of therapeutic baths. If we agree with Vogt regarding the action of the baths as an unspecific stimulus which activates the protoplasm within

the skin, and bear in mind the three cases quoted above, we can follow the progressive improvement of a condition treated by balneotherapy with greater insight, and the reaction, to which much greater attention is paid nowadays than in the past, appears more intelligible.

Vogt's view reminds us of earlier observations, like the classical and precise description of a balneological reaction given by Hufeland, who compares it to the process set up by non-specific irritant therapy. He wrote: "Every spa treatment acts on the body by stimulating some processes of the processes and weakening others. It heightens excitability and diminished power; it increases the activity of the vascular system, sometimes to the point of pyrexia, and produces congestion of the blood and abnormal increase or inhibition of secretions; the patient forms new relationships with himself and with this environment." Hufeland goes on to say: "Every spa treatment must be looked on as an artificial disease process and the treatment directed accordingly."

A treatise of Ragaz, written more than two hundred years ago, contains the words: "If a part of the body, either external or internal, has suffered from disease ten years or more before a bath treatment, the patient will feel the water 'tapping' at the part and showing him unerringly where it is." The physicians of those days had no idea that this "tapping" of the water was the positive phase of a process analogous to modern irritant therapy, but their writings of long ago contain many of our modern ideas.

We have by no means reached the limit of knowledge in our ideas about balneotherapy. There remains the question: How does the stimulus in the mineral water and its salts act on the skin? Is the process an electrical one? And, if not, what is it?

EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

1930 Annual Meeting in St. Louis

IMPORTANT ANNOUNCEMENT

A Post-Graduate Week of Physical Therapy

in conjunction with the

Ninth Annual Meeting

American Congress of Physical Therapy

September 8, 9, 10, 11, 12, 1930

New Hotel Jefferson
St. Louis, Missouri

Plans have already been completed for the 1930 session of the American Congress of Physical Therapy. The entire week of September 8 will be devoted to post-graduate instruction in physical therapy. This program of teaching will include both theory and practice and will range from the basic fundamentals to the more advanced subject. Every phase of physical therapy will be included: light, heat, electricity, radium, x-ray, therapeutic exercise, massage and occupational therapy. There will be clinics and clinical addresses, and a special half day session in the sections of medicine, surgery, and ear, nose and throat will be devoted to the consideration of inter-related and borlerline problems. The week's work will be of the most intensive nature and of real post-graduate calibre. A preliminary schedule will be published about June first. Those interested are advised to send for this schedule and make early reservation as from all indications there will be a capacity attendance. This might necessitate limitation of numbers for special classes.

A unique part of the program will be a half-day session set aside for the consideration of problems of the physical therapy technician. Technicians will be permitted to enter into the discussion and to present their problems by address, subject to the rules of the Congress. The purpose of such a joint session as this is to create a closer and more mutual understanding between physician and technician and for the interests of improved results in the work.

While practically all participation in the program will be on an invitational basis, an opportunity is afforded those of the members who desire to take part to write to the chairman of the program committee and state what they have to offer for the interests of the session. Suggestions are welcomed and if they possess merit will be put into effect.

Unfortunately only a limited amount of space will be available for technical exhibits. Manufacturers and dealers desirous of displaying equipment are urged to apply to the executive secretary immediately as the space will be assigned in the order in which applications are received. Diagrams are now available.

The new Hotel Jefferson has been selected headquarters for the Congress. Reservations for rooms should be made direct with the hotel management.

The local (St. Louis) chairman of arrangements is Dr. F. H. Ewerhardt. All matters pertaining to the program and exhibits should be taken up with the executive secretary, Miss Lucille White, Suite 716, 30 North Michigan Avenue, Chicago.

ELECTROSURGERY IN GYNECOLOGY DISCUSSED BY DR. HOWARD A KELLEY AT SOUTHERN SURGICAL MEETING

At the forty-second annual meeting of the Southern Surgical Association, held at Atlanta, Georgia, December 10 to 12, 1929, Dr. Howard A. Kelley, of Baltimore, discussed the subject of "Electrosurgery in Gynecology." An abstract of his talk, as given in the J. A. M. A. for January 25, is as follows.

In general surgery, the field for the new agent electrosurgery is a wide and most beneficent one, adding enormously, in some of his most difficult fields, to the efficiency of the surgeon and his delight in his work. In gynecology, it is an indispensable agent for the following reasons: 1. It is far cleaner than are previous methods and sterilizes as it proceeds. 2. It is a working-at-a-distance knife and fork procedure, as it avoids all handling of the structures. 3. It checks the hemorrhage of the smaller vessels and gives a better continuously visible field. 4. An active hemorrhage can usually be checked at once by catching the vessel delicately and turning on the current, which seals it effectively. 5. Ligatures are largely avoidable, in this way saving much time. 6. Nice work can often be done at a distance, say, deep in the pelvis, as easily as near the surface. 7. *Pari passu* as the operation proceeds the lymphatics are sealed. 8. It is invaluable in destroying any lingering infected area or disseminated malignant growth which cannot be dissected out. 9. As a method of doing a refined dissection, it is admirable. 10. If we had always been accustomed to depending on electrical surgery and some iconoclast were to invent the scalpel, ligatures and sutures with their oft-accompanying manipulations of the tissues, we would at once reject these novelties as being markedly inferior in every way, enhancing the risks both of mortality and of morbidity to the patient. Where usable, this method is as much ahead of scalpel surgery as our powerful modern electric engines are ahead of Richard Trevithick's and George Stephenson's locomotives.

COMMERCIALIZING PHYSIOTHERAPY

The following article is taken from the Journal of the Indiana State Medical Association, 23:84, Feb., 1930:

Physiotherapy has its place in medical practice, but something must be done to stem the tide of commercialism that now surrounds it. There have been established low-grade proprietary schools of massage and physiotherapy, and manufacturers are sponsoring commercial courses in physiotherapy given by unqualified or perhaps by partly qualified lecturers. Worse than all, some of the manufacturers are selling their wares to drug stores, department stores, and even direct to lay persons, accompanied by books or pamphlets giving indications for and how to use physiotherapy appliances. In some states an attempt has been made to license physiotherapy, and in some barber shops you find signs that advise the public that one or more of the employees of the shop are prepared to give physiotherapy treatment for various imaginary or real ailments, and most of the athletic departments of clubs offer similar attention. In consequence of all this, physiotherapy is getting an undeserved black eye among many medical men who are thoroughly disgusted with so much commercialism and such deception in connection with the employment of a valuable adjunct in the treatment of many abnormal conditions of the human body. To offset this there must be some attempt made to educate the public as well concerning the field of usefulness of physiotherapy and its exact limitations. The Bureau of Publicity of the Indiana State Medical Association can well afford to have two or more articles for lay consumption dealing with this proposition.

FIFTH INTERNATIONAL CONGRESS OF PHYSIOTHERAPY

We must draw our readers' attention on the fifth international Congress of Physiotherapy, which will take place in Liege from the 14th till the 18th of September, 1930.

On the 20th of January, 25 foreign committees were formed as follows: France, Switzerland, Italy, Luxemburg, Holland, Denmark, Portugal, Spain, Germany, United States of America, Egypt, Japan, Sweden, Finland, Norway, Austria, Hungary, Argentine, England, Poland, Bulgaria, Brazil, the French Colonies, Canada, Peru.

The chief questions to be treated will concern rheumatism and affections of the central nervous system, both belonging to the physiotherapy domain.

Four speakers are announced: Holland, France, Denmark, Belgium.

A third general question, concerning the University Teaching of Physiotherapy will also be treated. A Belgian speaker and a German one are already appointed.

In the sides of kinesitherapy, physical education, radiology, electrology, hydriology, thermotherapy, actinology, 22 reports and 49 communications are entered in the program.

In order to make easy the organization of these important sessions, we beg our readers to communicate their adhesions, without any delay (the same for the eventual work they would judge useful to present) to Doctor Dubois-Trepagne, the Secretary General, 25, Rue Louvrex a Liege, Belgium. The Organizing Committee should like to receive the works before the 15th of April, in order to be able to print them.

The subscription is settled to 150 Beglian francs, payable to the Postcheque Account of the Congress No. 243,605, Doctor de Keyser a Bruxelles.

All requests of information to be addressed to the Secretary General's Office, 25, Rue Louvrex a Liege.

MOTION PICTURES AS AN AID IN MEDICAL INSTRUCTION

The value of motion pictures for medical instruction is gradually becoming more appreciated. For the student they can never replace experience gained from personal contact with disease, nor can they supplant the present well established methods of teaching medicine. But as an adjunct to the methods in vogue at present, by facilitating the instruction, conserving the time of instructors and students, and by economy of materials, they are of inestimable value. Naturally such statements presuppose high grade production. Accuracy as to scientific detail, good cinematographic technic, and the best of photographic quality are primary requisites. With these qualities incorporated motion pictures acquire considerable value in all branches of medical science.

For the medical student and the postgraduate student motion pictures produced primarily for lecture purposes can be used with the greatest success. They have the advantage over the usual lectures that innumerable repetitions are possible permitting the student to study the subject until he has acquired a thorough understanding of the facts presented. Furthermore most of us are visual minded with the result that by this method of presentation the subject matter can be digested and assimilated more rapidly.

From the surgical standpoint, the motion picture can bring to the student and profession at large the work of the outstanding surgeons. Everyone will admit the limitations of the motion picture for operative demonstration, and no one will presume to claim that surgery, as such, can be taught by motion pictures; but motion pictures of certain operations, carefully selected with regard to their adaptability to photography, can demonstrate successfully many of the fundamentals of surgical technic as practiced by leading surgeons. Comparison of differences in the details and mechanics involved can serve as an introduction to the beginner, and leads to a broader and more comprehensive understanding of the subject for the more advanced student. By this method the best work can be available to all at present and in the future, and aside from purely historical and sentimental considerations, such records will have a very practical value for posterity.

For physiologic and pathologic demonstrations, the motion picture is most practical. An

experiment once satisfactorily performed and photographed endures for all time, making further repetition unnecessary. Motion pictures of such experiments present the essential features in a minimal amount of time, and, for instructional purposes, eliminate the uncertainty coincident with any experimental demonstration. Without any preliminary laboratory preparation students can see the experiment at any time and as often as desired, to study it to their utmost satisfaction. These features are a distinct advantage to the student as well as the instructor. In addition there results a tremendous economy in time and material. By the skillful use of carefully prepared animated drawings many physiologic processes and pathologic reactions, not readily discernible, can be graphically shown. Many of the more delicate reactions, demonstrable only to individuals or small groups with the greatest difficulty, can be readily shown and easily understood. Phases of this work which do not lend themselves well to actual photography can also be presented by such drawings, making the subject complete in all details.

In microscopic work for instruction and research purposes, microcinematography has unlimited possibilities. The introduction of the microscope opened vast unknown fields to exploration. The moving picture camera, applied to the eye piece of the microscope, advances such exploration by making possible a study and analysis of the motion of microscopic life. By the stop motion camera, or the popularly known slow motion picture, the development, growth, and life processes of microscopic life can be photographed and studied. Whereas formerly the scientist spent hours and days constantly at the microscope to describe phenomena occurring on the microscope stage, the motion picture camera, with suitable mechanical devices, can not only see the processes as they occur, but gives a permanent record which all can see, a record available for all time. The value of such an advance in the field of research can readily be appreciated. For the investigator many tedious hours at the microscope are eliminated. There results an increased accuracy of results deu to minimizing the human element, always subject to error. The investigator can repeat his experiment before his own eyes and the eyes of others innumerable times without all the difficulties of actually repeating the experiment. There is available a permanent record. For the student such records present facts which formerly he could not visualize except through his imagination, stimulated by lengthy descriptions. As applied to bacteriology, parasitology, embryology, and allied subjects, such films may be considered treasures.

Appreciating the value of motion pictures for medical instruction, whether for the student or postgraduate, Eastman Teaching Films, Inc., in collaboration with the American College of Surgeons, has undertaken productions along the lines described. Improved technic, improvement of subject content, and careful scientific supervision combine to make these films preeminent in the field of medical motion pictures. It is the determination of their proper application which, to a large extent, governs the production of Eastman Medical Films.

ANNOUNCEMENT

The annual meeting of the American Physiotherapy Association will be held in Detroit, Michigan, June 23 to 26, inclusive. The Association headquarters will be at the Fort Selby Hotel, Detroit, Mich.

A section on electrosurgery has been added to the American Academy of Physical Therapy this year. Wm. L. Clark, the outstanding pioneer in this field has been made chairman of the section. It is planned by him to make next year's program, which meets in Boston, an ambitious demonstration of its true worth by outstanding papers and clinics. Every effort will be exerted to arrange a program of high standard and worthy of the best traditions of the academy. With Clark as the inspirational background the success of the section is assured.

THE STUDENT'S LIBRARY

BOOKS REVIEWED

THE PRINCIPLES OF ELECTROTHERAPY AND THEIR PRACTICAL APPLICATION. By *W. J. Turrell,* M.D., Published by Oxford University Press, London, England.

The present edition has been extensively rewritten and new material incorporated. Two new sections have been added, one on the history of electrotherapy and the other on the management of electrical burns. A special chapter has also been included which discusses methods, and gives practical hints on treatment, drawn from the author's rich experience. The work is divided into six sections and attempts not only to cover the general principles of electrotherapy, but it includes a concise discussion on "The Therapeutic Action of Radiant Energy." The section on the History of Electrotherapy is a splendid and scholarly introduction to the subject. There is appended a valuable bibliography after each section, and additional references are interspersed throughout the volume which gives the student added opportunity for collateral reading. The book not only shows careful revision but there is included new ad interesting data which brings the subjects under discussion down to date. Both the theoretical and clinical side of the subject is considered; indeed, one supplements the other side. It, therefore, will have as strong an appeal to the practitioner as it has to the student. There may be some, who will question the literary propriety of including a section on radiation therapy and x-ray treatment under a title of "Principles of Electrotherapy." To have omitted this from the treatise would have been at a sacrifice of valuable information and a loss to the "balance" of the book.

It is regretted that the author saw fit to reduce discussion of Oto-rhino-laryngology problems to a chapter, the space of which occupies slightly over two pages. To refer the practitioner back to the specialist and the specialist to visit a well-equipped electrical department is a frank error in judgment and detracts greatly from the value of the book. Such arguments could have been as illogically applied to any of the other special sections and with equal dissatisfaction to the reader. In the light of existing books on the subject (Koeppe, Leroux-Robert, Hollender & Cottle, etc.) and the numerous articles published in recent years by recognized specialists in this field, there remains little excuse for such a chapter. The omission of any bibliography and the misspelling of the single reference (Delinger for Dillinger) is indicative of negligence and startling carelessness. The author has not here maintained the same high standards found in other parts, and this is greatly to be regretted.

INTERNATIONAL ABSTRACTS

Viosterol (Irradiated Ergosterol) in Treatment of Parathyroid Tetany. J. C. Brougher. J. A. M. A., 94:471-473, Feb. 15, '30.

Four patients who developed a parathyroid deficiency after bilateral subtotal lobectomy were relieved of tetany by the administration of cod liver oil and subsequently viosterol. Two of these patients did not develop tetany until pregnancy. A fifth patient who developed tetany after an extensive intestinal resection was benefited by the use of viosterol.

Compression Technic in Gastro-Duodenal Roentgen Diagnosis. P. G. Boman. J. A. M. A., 94:464-468, 1930.

The compression method increases the accuracy of gastro-duodenal roentgen diagnosis.

It permits the demonstration of direct evidence of disease in a higher percentage of cases.

It enables a more intelligent interpretation of the lesions present and a better understanding of the treatment indicated.

Relief of Projectile Vomiting in Infants by Radiation of the Upper Chest Region. O. Barbour & J. W. Connell. Illinois Med. J., 57: 110-120, Feb., 1930.

Projectile vomiting was relieved in 17 infants herein reported and in 4 infants previously reported, by radiation of the upper chest region.

Of the 21 cases

A. 5 were relieved permanently by one exposure to the roentgen rays.

B. 3 were relieved permanently by one exposure to radium.

C. 12 were relieved temporarily by exposure to the roentgen rays, and then permanently by exposure to radium.

D. 1 case was exposed to the roentgen rays without relief, later was relieved temporarily by a Rammstedt operation, and 3 months later permanently relieved of vomiting by exposure to radium.

Thirteen were males, eight were females.

Ten were first-born.

Six cases were breast fed and 15 were artificially fed.

Four contained cases of projectile vomiting in their family history.

Cholecystography. R. T. Wilson. Texas St. Med., 25:668-672, Feb., 1930.

Cholecystography has been greatly stimulated by the introduction of opaque dye.

Both oral and intravenous administration of the dye have advantages.

Ooral administration is more convenient, gives less reaction, and is more acceptable to the patient. In a group of 201 operations, positive evidence of gallbladder disease had been demonstrated by cholecystography with oral administration of the dye, in 75.5 per cent of the cases.

In this group of operations, in which stones were found, 94.3 per cent were recognized roentgenologically before operation, as cases of diseased gallbladder.

No response, slight response and irregular cholecystograms are evidences of diseased gallbladder and ducts.

Fifty per cent of our own series of strawberry gallbladder cases gave positive, and fifty per cent negative response.

Chest Roentgenograms of Nontuberculous Children Suspected of Being Tuberculous. E. Wolff & R. S. Stone. J.A.M.A., 94-548-461, Feb. 15, '30.

The roentgenograms of the chest of children without acute illness and giving a negative tuberculin reaction may show single or multiple, large or small axial vessels in the hili, multiple axial vessels up to 2 or 3 mm. in diameter in the lung tissue, localized lung markings, localized pleural thickenings, or none of these shadows. It is therefore apparent that a diagnosis of tuberculosis of the mediastinal glands or lung tissue cannot be based on these observations.

No calcifications, glandular tumors or localized pulmonary infiltrations were found.

No definite correlation was found to exist between the positive roentgen observations and the clinical history.

Light Clinics at Tuberculosis Dispensaries. G. L. Cox. Brit. J. Tuberc., 24:1-7, Jan., 1930.

Artificial light treatment has continued to give satisfactory results, particularly in regard to patients suffering from tuberculosis of the skin and tuberculous adenitis with abscess formation and skin involvement, which conditions are very slow in yielding to other forms of treatment.

Of the total patients attending light clinics 73 per cent were able to continue their normal occupations during the course of treatment.

One-fourth of the patients treated during the year were assisted by the payment of their railway, bus, or tram fares to the dispensary light clinics.

In regard to the 45 skin cases which became "quiescent and apparently cured," the average duration of the disease before the patients commenced light treatment was 13 years and 6 months, whereas the average duration of light treatment was 7¾ months.

For the whole 190 cases which became "quiescent and apparently cured," the average duration of the disease before the patients commenced light treatment was 4 years 8 months, whereas the average duration of light treatment was 6½ months.

Of the 190 cases concluding treatment in 1928 on becoming "quiescent and apparently cured," the consultant tuberculosis officers would normally have recommended 113 for treatment at hospitals. Based on the average duration of treatment of such cases, the cost would have been not less than £2,395, whereas their treatment at the dispensary light clinics actually cost (all inclusive) £1,150—a saving of £1,245.

The Lancashire scheme has so far treated 950 patients, and it has undoubtedly been successful: (a) In the results of treatment attained; (b) in convenience to the patients by permitting treatment near their homes and enabling three-fourths of them to continue their normal occupations; and (c) in effecting a substantial saving over other forms of treatment. Its success has been due (1) in particular to the fact that the tuberculosis medical staff have had facilities given them by the County Council to specialize in light therapy, the experimental work lasting for two years before the scheme was applied over the whole administrative area; and (2) in general to the County dispensary scheme, consisting of a graded staff of consultant and assistant tuberculosis officer in charge of large areas, no large sanatoria, but the dispensary staff with their own hospital beds, and finally themselves using modern facilities for diagnosis such as x-rays.

Stimulating Action of Ultraviolet Rays on Development of Defense Powers Against Tuberculosis in Children. Clinica Pediatrica, Modena, 11:798-892 (Sept. 1929).

A series of children, aged from 14 months to 9 years, were irradiated with ultraviolet rays by Blasi. Before the irradiation a Pirquet test was made. Each child received ten irradiations; the first one was very short, of about two minutes' duration. In this treatment, the anterior part and then the posterior part of the nude body were alternately exposed to ultraviolet rays at a distance of 60 cm. from the lamp. The interval between the first and second irradiation was one day; the subsequent treatments were given daily and the duration of each exposure was increased two minutes a day, so that at the tenth treatment each child was irradiated for twenty minutes. One hour before the first irradiation and one hour after the last treatment, blood was taken from each fasting child, and the opsonic action of its serum on the tubercle bacillus was tested. The opsonic action of the blood serum of children with a positive Pirquet test, after ten ultraviolet irradiations had been given, was more marked than that of the serum of children with a negative Pirquet reaction. All children who were irradiated showed an increase in the percentage of phagocytes, as well as of the phagocytosed bacilli. The author believes that ultraviolet rays, by stimulating the process of phagocytes, may be of great value in tuberculosis, especially pulmonary tuberculosis.—J. A. M. A., Nov. 16, '29.

Irradiated Yeast as Means to Increase Quantity and Vitamin Content of Mother's Milk and of Cow's Milk. M. Wachtel. P. 1513. Munchner medidinische Wochenschrift, Munich, 76:1 95-1536 (Sept. 16) 1929.

Wachtel reports that when cows were fed irradated yeast the quantity of milk increased considerably, and that this milk contained larger amounts of vitamins B and D. Its antirachitic quality was demonstrated in experiments on rats. The author concludes that, if this method of prophylaxis of rickets could be generally employed, the problem would be considerably simplified. All other aids for the prevention and treatment of rickets, such as medication with cod liver oil, or with viosterol preparations, irradiation of the milk or of the cows would become superfluous. Nursng mothers could likewise eat the irradiated yeast.—J. A. M. A., Nov. 16, '29.

Influence of Sun Baths at High Altitudes on Blood Sugar Curve. Basel. Schweizerische medizinische Wochenschrift, 59:901-924, (Sept. 7) 1929.

Von Deschwanden points out that, in many persons, the tolerance for carbohydrates is increased under the influence of the climatic conditions at higher altitudes. He investigated this problem by making tests on persons who had always lived in the high mountains, on those who had lived there for six months and on persons who had been under the influence of this climate only about twenty-four days. The author first investigated the influence of sun baths on the sugar content of the blood. Then he made dextrose tolerance tests and studied the blood curve when the patients were not exposed to the sun. On another day the administration of dextrose was followed by a sun bath lasting one hour. And in the last experiment the patients were first given the sun bath and after that they received the dextrose. The observations during these experiments are summed up as follows: 1. Immediately after acclimatization in the high mountains the blood sugar curve of alimentary hyperglycemia shows a steeper rise, and a quicker fall, than in the lowlands. The peak of the curve is often higher than in the lowlands. 2. In persons who are acclimated, the islands of Langerhans show an increased and an accelerated production of insulin. In the native mountain population this condition is probably congenital. The blood sugar curve of alimentary hyperglycemia shows a steeper ascent, a lower peak and a quicker descent than in the lowlands. 3. In some persons, however, even if their sojourn at the high altitudes lasts longer than six months, the function of the islands of Langerhans does not become adjusted to the climate. Sun baths in the high mountains effect a decrease in the sugar content in acclimated persons and in natives. The opposite results that are noted in some persons are probably due to constitutional factors. 5. Sun baths stimulate the production of insulin. 6. Whether the amount of insulin is also increased under the influence of the sun cannot be definitely stated. 7. The increased tolerance for carbohydrates in the high mountains is proved in points 2 and 5.—J. A. M. A., Nov. 16, 1929.

Roentgen-Ray Shadow Resembling Renal Calculus Caused by Papilloma of the Skin. W. R. Delzell. Am. J. Surg., 8:103-104, Jan., 1930.

Skin lesions may cast shadows resembling calculi.

Author reports case where papilloma was not caused by density of air around it from pressure, as it cast a similar shadow when excised, and it was not caused by increased melanin, but was caused either by the collagen stalk or reduplication of epithelial layers.

Stereoscopic plates are helpful in locating the exact position of doubtful shadows.

Sodium Iso-Amyl-Ethyl Barbiturate. J. T. C. McCallum and L. G. Zerfas. Am. J. Surg., 8:39-43, Jan., 1930.

Sodium iso-amyl-ethyl barbiturate, when used intravenously or orally with morphine (⅙ to ¼ grain, given hypodermically) to produce analgesia and narcosis short of sleep, was a very effective preliminary preparation for local anesthesia.

The intravenous injection of sodium iso-amyl-ethyl barbiturate sufficient to produce sound sleep is advised only in those patients who desire to be unconscious or

in children and uncooperative patients to whom local anesthesia is to be given.

It is seldom necessary to give adult patients more than 1.0 gram (15 grains) of the drug at one time to produce profound narcosis.

The drug, prepared in a 10% solution, when administered intravenously, should be given at the rate of approximately 1 c. c. per minute, with careful observation of the patient during the time of the injection. By this means one is able to more or less control the dosage.

Sodium iso-amyl-ethyl barbiturate acts as a prophylactic measure in counteracting the toxic manifestations of procaine occasionally observed when local anesthesia is employed.

Treatment of Pituitary Tumors; Role of Roentgen Ray and of Surgery. E. B. Towne. Ann. Surg., 91:29, Jan., 1930.

Five cases are reported by Towne which illustrate long-standing favorable results from roentgen treatment, and show that if the result is not good, a cystic tumor, favorable for surgery, may be diagnosed. He believes that the present custom of following surgery immediately with roentgen treatment confuses the issue. The two methods may be used separately without jeopardizing the patient's chance for a cure. He proposes that all pituitary adenomas be treated by roentgen rays under the observation of the ophthalmologist and the neurosurgeon; that the treatment be stopped as soon as improvement begins, and that surgery be undertaken short of six months only when visual acuity and fields recede under roentgen treatment.

Primary Carcinoma of Ureter. R. D'Aunoy and A. Zoeller. Arch. Physical Therapy, 9:17, Jan., 1930, Part 1.

A case of primary carcinoma of the ureter is reported by D'Aunoy and Zoeller, with a summary of the salient features of the forty-eight cases recorded in the medical literature. Twenty-eight of the recorded tumors were papillary; twenty were nonpapillary. The incidence is about equal for the two sexes, with the greatest number occurring during the sixth and seventh decades of life. The lower part of the ureter is more frequently the site of the lesion. No etiology can be ascribed, although concurrent lithiasis was present in six cases. The concensus seems to be that so-called benign papillomas of the ureter and of other parts of the urinary tract must always be regarded as highly suspicious growths so far as actual, as well as potential, malignancy is concerned.

Cancer of the Mouth. J. L. Campbell. J. M. A. Georgia, 19:52-53, Feb., 1930.

The immediate cause of the large mortality in cancer of the mouth is failure of cooperation between the patient and the doctor, due to lack of popular education. 85 per cent of cancers of the mouth occur in men past 45 years of age who have used tobacco to excess and otherwise neglected to care for their mouth. The most prominent factors in causing cancer of the mouth are: excessive use of tobacco; oral sepsis; neglect of sharp, broke nor irregular teeth which cut or bruise the tongue or inside of the cheek; neglected deposits of salivary calculi around the neck of the teeth; and ill-fitting dental plates. Regular systemic visits to the dentist is good insurance against cancer of the mouth. The author reports that complete destruction of the lesion by cautery, followed by deep roentgen radiation of both sides of the neck and later block dissection, where indicated, has given very satisfactory results.

Deep X-ray Therapy. E. C. Thrash and W. P. Baker. J. M. A. Georgia, 19:58-61, Feb., 1930.

The authors review the results obtained from the treatment of five hundred cases. In reporting their work they define dosages and their application to the type of cases treated. Dosages are placed under three classifications, lethal, paralethal and mild reactionary, the lethal dose being one that would kill the cells, the paralethal one that would completely arrest or greatly inhibit mytosis, and the mild reactionary one that would stimulate mytotic and other physiological activities of the cells.

Brief summary of the five hundred cases treated is made. In this list are included all forms of neoplasms in all parts of the body, and many other pathological conditions including Hodgkin's disease, leukemia, thymus enlargement, cystitis, and thyroid dyscrasias, acne, eczema, epidermophytosis, lupus, ringworm, hay fever, boils, carbuncles, sycosis, and many other skin lesions; bacterial endocarditis, haemorrhagic endometritis, tuberculosis of the larynx, tuberculous glands, sciatica, neuritis, tuberculous peritonitis, Reynaud's disease, various chronic infections, bronchial asthma, and bronchiectasis.

Except for melonotic sarcomas, breast cancers have been the most discouraging, although this type of tumor treated under proper conditions and properly selected gives in many cases gratifying results. Treatment of abdominal cancers has been encouraging. Superficial cancers, especially of the skin, respond remarkably well. Postoperative brain tumors have responded well to treatment.

The Incidence of Sinusitis in Asthmatic Children. Robert Chobot. Am. J. Dis. Child., 39:257-264, Feb., 1930.

Incidence of sinus infection in asthmatic as well as in normal children is much higher than has hitherto been believed.

In the series of 100 asthmatic children, 60 per cent were boys and 40 per cent were girls.

Fourteen per cent had their first attack in the first year of life and 19 per cent in the second year, which figures compare closely with those of other observers.

Fifteen per cent of the patients studied had negative skin reactions. The incidence of the age of onset in this group parallels that in the hypersensitive patients.

Fifteen per cent of the sentitive patients had their first attack in the first year and 23 per cent in the second year.

The fifteen negative cases in this series were studied and a positive family history was obtained in five children.

Forty-one per cent of all patients, both sensitive and nonsensitive, had sinus infections, as shown by roentgen examination.

Treatment should be conservative, but puncture and irrigation should be carried out when conservative measures fail.

In order to achieve the best results, close cooperation with nose and throat specialists is essential.

Colloidal Bismuth in the Treatment of Far Advanced Cancer. J. P. O'Brien and B. F. Schreiner. Radiol. Rev. & Chicago M. Rec., 52:49-51, Feb., 1930.

Bismuth had no influence in prolonging the life of the patients treated. The use of colloidal bismuth, Diasporal "360," as observed in these cases, was of value in the relief of pain caused by the metastases, necessitating less opiates, or the entire withdrawal in a few cases. In only one case was a definite regression of the tumor observed prior to her radiation treatment.

Colloidal bismuth in three instances has relieved pain which was due to metastases.

Colloidal bismuth and x-radiation, as used in this series of cases, has been disappointing in that no marked regression of the tumor process was observed.

The administration of colloidal bismuth prior to irradiation has apparently not enhanced the value of the x-rays.

The Treatment of Benign Uterine Hemorrhage by Radiation. W. C. Danforth. Radiol. Rev. & Chicago M. Rec., 52:52-56, Feb., 1930.

Radiotherapy, and particularly the use of radium, constitutes one of the most valuable additions to the resources of the gynecologist. For the severe bleedings of the myopathic type it has replaced operation.

The advantage to the patient is found in the shortened hospital stay, greatly decreased discomfort, and lessened danger. Patients usually remain four or five days as compared to the twelve or fourteen required after laparotomy. Nausea occurs in some cases but as a rule disappears soon after the removal of the radium from the uterus. It is not wise to dismiss irradiated patients from the hospital without a period of rest.

It should be emphasized that, in the work of the gynecological surgeon, irradiation is not regarded as a competitor of surgery. It is illogical that any idea of competition between methods should exist. The gynecologist should carefully choose the method adapted to the individual case, after due consideration of the pathology.

The author regards irradiation as one of the most important of therapeutic resources.

X-ray Treatment of Superficial Neoplasms. W. E. Pennington. Radiol. Rev. & Chicago M. Rec., 52:62-64, Feb., 1930.

The success of roentgen treatment is very dependent upon the accuracy of the dose; the rapidity of the growth; the position of the lesion; the degree of inflammatory structures about the growth; the previous treatment and the physical condition of the patient.

In treating neoplasms the author advises the use of the method that insures success. A high percentage of cures by means of x-ray have been accomplished by the author with very slight destruction of tissue and with excellent cosmetic results.

The Treatment of Toxic Thyroid With Rays of Short Wave Length. G. Clement. Radiol. Rev. & Chicago M. Rec., 52:65-67, Feb., 1930.

Before 1903 the treatment of the toxic thyroid was almost entirely medical. Since 1903 it has been largely surgical. From about 1910 to the present time, radiation, either by x-ray or radium has been advocated and is slowly but surely gaining ground.

Statistics show that about the same number of patients are benefited by radiation as by surgery. Two types of radiation are presented. One case is reported showing what ma be accomplished by radiation.

The author feels that the patient with toxic thyroid should be given the advantage of radiation therapy since the treatment causes no pain, no scar, little or no loss of time from hospitalization, no operative mortality and in addition, because the results are as good as by any other method of treatment.

A New and Efficient Rectal Anesthesia. A. Spiegel. Am. J. Surg., 8:97-101, Jan., 1930.

Two important events have marked the history of anesthesia during the last century; the introduction of ether and chloroform narcosis and the use of local anesthetics. The latter have not realized the hope once entertained that they would replace the inhalation anesthetics.

General anesthesia induced by injecting water-ether solution into the rectum (Roux, 1846) was found to be injurious to the mucous membrane of the lower colon and rectum. Ether vapor (Pirogoff, 1847) given rectally was not more fortunate.

Gwathmey's publication on ether-oil anesthesia by rectum (1913) made the surgical world realize anew the possibility of eliminating the disadvantages of the inhalation method. Reports from various sources refer to severe intestinal irritation, profuse diarrhea, attacks of pain and sometimes serious degeneration of the liver cells.

A preparation recently found in avertin was discovered which did not irritate the mucous membrane nor increase the danger of general anesthesia and permitted the performance of almost any operation.

Avertin has very little, if any, influence on the other organs of the body. However, when avertin solu-

tion is overheated or otherwise decomposed, its injection may produce severe injury to the rectal mucous membrane. The safety of the drug is dependent upon the relatively large margin between narcotic and lethol doses.

Author outlines preoperative treatment, preparation of avertin solution and method of administration.

Hernia of the Stomach Through the Esophageal Orifice of the Diaphragm. M. Ritvo. J.A.M.A., 94:15-21, Jan. 4, 1929.

An esophageal orifice hernia is a protrusion of a portion of the caria of the stomach through the esophageal opening of the diaphragm into the thorax. This type of diaphragmatic hernia was formerly considered very rare and therefore of but slight clinical significance. With the increasing use of the roentgen ray in the examination of the gastro-intestinal tract, it is being found with increasing frequency and several large series of cases have been reported during the last decade.

The present series consists of sixty cases, all diagnosed during the routine roentgen examination of the stomach with the opaque meal. These occurred over a period of five years, during which time about 8,000 gastro-intestinal cases were studied roentgenologically.

Enlargement of the esophageal orifice of the diaphragm with resultant herniation of the cardia may be congenital or acquired. The acquired cases are due to increased intra-abdominal tension plus some unknown factor which accounts for the herniation being through the esophageal hiatus rather than at one of the commoner sites of hernia.

My series comprised forty-one females and nineteen males. The ages varied from 21 to 72 years, the majority of the patients being over 40.

In fourteen patients there were no symptoms referable to herna. The remainder had complaints of varying degrees of severity. The commonest symptoms were epifastric pain, heartburn, nausea, vomiting, regurgitation and constipation. As a rule, the symptoms are rather indefinite, mild in degree, and of years' duration. The most typical complaint was a feeling of weight or pressure under the xiphoid, coming on during or soon after eating and relieved by a hit drink or by walking about for a few moments.

Small hernias give no physical signs. Large hernias may stimulate pneumothorax or hydrothorax.

The roentgen examination is usually the only means of arriving at a diagnosis. Very careful studies are essential to demonstrate this lesion. Fluroscopic observations in the prone, supine and oblique positions must be made, as the hernia is only rarely seen with the patient erect and is difficult of roentgen demonstration.

After the ingestion of the opaque meal, the hernia is seen as a round or ovoid shadow just above the diaphragm; it lies in or near the median line, usually to the left of the esophagus. The hernia as a rule connects with the stomach by an isthmus at the level of the esophageal orifice.

Roentgenologically, this condition must be differentiate dfrom diaphragmatic hernia of other types, diverticulum of the esophagus and stomach, cardiospasm, cardio-esophageal relaxation and eventration.

Treatment consists mainly of dietetic and preventive measures. Surgical operation is indica ted if the symptoms are severe. As a rule, however, the complaints are mild and operative measures are only rarely necessary.

Die Lichtbehandlung des Auges. (Phototherapy of the Eye.) Hirschfeld Birch. Zentralb. f. die Ges. Ophthalmologie und ihre Grenzgebiete, No. 14, 20:709-714, 1929.

Actinotherapy has especially been found of value in the inflammatory and infectious diseases of the corneal surface. It does not endanger the eye, if properly applied, and yields good results not attained to the same extent by other methods. The results were very good in superficial keratitis, marginal ulcers, ulcers due to pannus, ulcus rodens corneae. The results were especially favorable in recently infected ulcers of the cornea, in that hyperaemia of iris, precipitations and injections receded promptly owing to irradiation. The effect of irradiation was also very favorable in episcleritis tuberculosa and severe scrofulous ulcers of the cornea. The biological curative action of ultraviolet rays is due to the bactericidal effect of the short waves, as well as to the fact that these rays possess the property of promoting tissue regeneration. It is this property that is responsible for the ready detersion of the face of the ulcer and its transformation into a solid, though relatively translucent scar. The great point and chief difficulty is the adequate dosage. Generally, single exposures for from five to six minutes with the use of carbon arc lamps with quartz optics, copper sulphate and uviol filters are sufficient to obtain a good therapeutic effect. In case of need they can be repeated from two to three times daily. Sources of errors such as slurring of lenses, false position of the carbon rods, wrong focus distance, are scrupulously to be attended to. Continuous current is to be applied for the small Zeiss carbon arc lamp; for the big one alternate current as well. The Kromayer lamp, too, can be used for local eye irradiations. It can be used unfiltered. Exact dosage is of fundamental importance. It is best attained by the biological determination of the irradiation lamp. The author uses as unit (conjunctival dosis) the exposure time which produces intense hyperaemia with superficial necrosis on the palpebral conjunctiva of the rabbit after from twelve to eighteen hours. The conjunctival dose once determined for a lamp may be checked up from time to time by the photochemical way. The author pleads for the introduction of the conjunctival dose into eye irradiation like the USD in dermatology and surgery.

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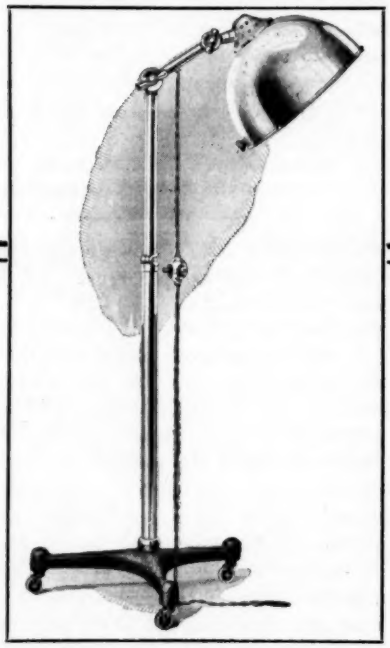

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